

(19)



(11)

EP 2 249 763 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
16.11.2016 Bulletin 2016/46

(51) Int Cl.:
A61J 11/04^(2006.01) B67B 7/48^(2006.01)

(21) Application number: **09706584.1**

(86) International application number:
PCT/GB2009/050084

(22) Date of filing: **29.01.2009**

(87) International publication number:
WO 2009/095716 (06.08.2009 Gazette 2009/32)

(54) **DELIVERY DEVICE**

FREISETZUNGSVORRICHTUNG

DISPOSITIF DE DISTRIBUTION

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR

(30) Priority: **31.01.2008 GB 0801682**

(43) Date of publication of application:
17.11.2010 Bulletin 2010/46

(73) Proprietor: **Mitchell, Claire**
North Yorkshire HG4 3DT (GB)

(72) Inventor: **Mitchell, Claire**
North Yorkshire HG4 3DT (GB)

(74) Representative: **Boakes, Jason Carrington**
Secerna LLP
The Catalyst
Baird Lane
Heslington East
York YO10 5GA (GB)

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Description

[0001] The present invention relates to a liquid delivery device which attaches to a container for flowable material, such as a fluid or a solid of such consistency as to be capable of behaving fluidly, e.g. powder, grain, etc.. The device attaches to a container such as a bottle, carton or pouch, and improves or facilitates the delivery of material from the container. The present invention particularly relates to a portable liquid delivery device which is suitable for attaching to an array of different liquid containers. A particular application of the invention relates to drinking containers.

[0002] Liquids are often purchased in a sealed container, e.g. a bottle, carton or pouch, which requires opening before the contents are delivered directly from the container or indirectly *via* suitable means, such as a straw or spout. Delivery of the liquid from the container may include dispensing, e.g. pouring, of the liquid into a secondary container or consumption, e.g. drinking, from the container by a person.

[0003] Bottles generally comprise a screw cap which requires removing before the liquid therein can be delivered therefrom. Cartons and pouches generally comprise a flap which is folded and adhered to an upper, outer part of the carton or pouch. The integrity of the adhesion is typically compromised by unfolding the flap which is then torn to access the liquid in the carton or pouch. The unfolded flap may define a spout to facilitate pouring the liquid from the carton or pouch. Cartons and pouches often comprise a frangible portion, e.g. foil, the integrity of which is compromised by puncturing, for example, to allow the liquid to be delivered from the carton or pouch. Where the liquid is consumed from the carton or pouch, the frangible portion can be punctured by a straw and the straw used to consume the liquid from the carton or pouch.

[0004] A disadvantage of containers, such as a bottle, carton or pouch, relates to the delivery of fluid from the container. In particular, liquid is often difficult to pour from such containers especially where a degree of accuracy is required. This may be particularly inconvenient where liquid is being dispensed from a primary container into a secondary container, especially when an access opening of the secondary container is small. Also, liquid often drips from the primary container after dispensing which is also inconvenient particularly where mess or staining by the liquid is undesired.

[0005] An example of a dispensed liquid is engine oil which is purchased in a container having a neck or collar defining an aperture which is sealed by a screw cap fitting over the neck or collar. To avoid spillage, the oil is typically poured from the can into the engine *via* suitable means, such as a funnel. Where a funnel is unavailable, oil spillage is a common problem and particularly undesirable. Another example may be where the liquid is wine which is purchased in a glass bottle having a neck defining an aperture which is sealed by a cork fitting within the neck

or a screw cap fitting over the neck. The neck of the bottle is generally inadequate to prevent dripping when pouring or decanting the wine, which is particularly inconvenient due to staining. A further example may be where the liquid is milk suitable for baby consumption which is purchased in a carton. The milk generally requires transferring from the carton to a suitable bottle generally including a teat for the baby to drink from. Carrying a separate carton around may be inconvenient for a parent or carer, especially when away from home or in a public place having limited facilities. Where the carton comprises a foil portion which is punctured to open the carton, transferring the milk from the carton to the baby bottle may be particularly difficult and inconvenient.

[0006] Consuming liquid directly from drinking containers can also be particularly difficult or impossible for some people. Such people include those who are unable to drink independently, e.g. babies or people with special needs including the elderly, and those who have a particular medical condition which hinders their ability to drink directly from such containers.

[0007] These people often require additional means, e.g. a teat or mouthpiece, to allow them to drink from the container, either independently or dependently.

[0008] Gaining access to the liquid in liquid containers can also be a problem for some people, particularly where a degree of accuracy is required such as piercing a small area of foil in a carton or pouch with a straw. People with medical conditions including arthritis or Parkinson's disease, for example, may find the conditions hinder their ability to open such containers prior to consumption or dispensation of the liquid therein.

[0009] A number of delivery devices are described in DE9413191, US2006/011497, DE 196 45 532. WO90/13509 discloses a liquid delivery device in accordance with the preamble of claim 1.

[0010] A first aspect of the present invention provides a delivery device according to claim 1.

[0011] The further attachment part is differently conformed to the first attachment part to allow the first delivery part to be attached to a differently structured and/or sized container and/or to be attached in an alternative manner. The difference in structure may range from a bottle having a neck or collar defining an outlet aperture to a carton having a frangible portion, the integrity of which requires compromising to form an outlet aperture in the carton for the delivery part to attach to.

[0012] Preferably, the first or further attachment part connects the delivery inlet with the container outlet aperture. Suitably, the delivery inlet may connect directly to the outlet aperture. Alternatively, the first or further attachment part may define an attachment conduit having an attachment inlet and attachment outlet wherein the first or further attachment part is engageable with the delivery part in such a manner that when so engaged the delivery conduit and the attachment conduit define a fluidly continuous channel through the device from the attachment inlet to the delivery outlet.

[0013] The interchangeability of the first and further attachment parts advantageously enables the device to be attached to a range of containers of varying structures having different means of opening an outlet aperture thereof, such as a screw cap, cork, ring pull, unfoldable flaps and/or frangible portions or other means. The device is advantageously a universal material delivery device which may be attached in sealing engagement to more than one type of container.

[0014] Preferably, the device alternatively or also comprises at least one further delivery part which is selectively engageable with the first or further attachment part. The further delivery part is differently conformed to the first delivery part. The first or further delivery part may be selectively engaged with one of the first or further attachment parts depending on the desired functionality of the delivery part. This may be particularly convenient for providing a different means of delivering the material from the container. For example, the first delivery part may be a form of spout for pouring material from the container, whereas at least one further delivery part may be a form of mouthpiece suitable for consuming material, e.g. liquid, directly from the container. Advantageously, the device may also provide multiple functionality to a user to allow flowable material to be delivered from the container.

[0015] One disclosure of the first attachment part may comprise an enclosure formation adapted to engage over and around an aperture of a container externally thereto. For example, the enclosure formation is a cap having a circular cover and wall portion peripherally extending perpendicularly from said cover to surroundingly engage around an outlet aperture defined by a narrowing in the container, such as a neck or collar of a bottle, for example. Preferably, the cover comprises an aperture complementarily shaped with the delivery part to allow the cap to attach the delivery part to the container in such a manner as to define when so connected a fluidly continuous channel from the container to the delivery outlet of the delivery conduit. Suitably, the cap may be a screw cap having a radial wall comprising a screw thread to allow the screw cap to engage with a corresponding screw thread on the neck of the container and attach the delivery part thereto. Preferably, the screw cap is sufficiently rigid to withstand forces when screwing the screw cap to a neck or collar of a container, for example. Alternatively, the cap may be a deformable cap having a peripheral wall portion which is elastically deformable allowing it to stretch over the neck or collar of a container and attach the delivery part thereto. Preferably, the deformable cap is sufficiently elastic to stretch over the neck or collar of a container whilst remaining attached to the neck or collar once stretched thereover.

[0016] An alternative disclosure of the further attachment part may be an insertable attachment part with respect to a container and may be adapted to insert within the outlet aperture of a container. The insertable attachment part is insertable within a container through an aperture therein in use. The insertable attachment part pref-

erably defines an attachment conduit comprising the attachment inlet and attachment outlet. Preferably, the wide end of the insertable attachment part comprises the attachment outlet and a narrow end of the insertable attachment part comprises the attachment inlet.

[0017] Suitably, the insertable attachment part may slidably insert in sealing engagement into an outlet aperture, for example defined by the neck or collar of the container, to retain the insertable attachment part therein. Suitably, the insertable attachment part may be a resilient material, e.g. rubber, to ensure a secure fit and sealing engagement with the neck or collar of the container is achieved. Preferably, the attachment outlet of the insertable attachment part connects with the delivery inlet to define a fluidly continuous channel through the device from the attachment inlet to the delivery outlet. Preferably, the insertable attachment part is a material providing sufficient resilience to allow the insertable attachment part to be slidably inserted into the neck or collar of a container whilst providing sealing engagement when inserted therein. Sealing means may suitably be provided to securely seal the insertable attachment part in the outlet aperture of a container. The sealing means may comprise means to increase the width of the insertable attachment part in the outlet aperture thereby to provide an effective seal. The sealing means may comprise an elongate member extending through the insertable attachment part, the elongate member having a first end adapted to engage with the narrow end of the insertable attachment part and second end extending from the wide end of the insertable attachment part. A shoulder may be provided at the first end to engage with the narrow end of the insertable attachment part. A lever may suitably be coupled to the second end and adapted to move the first end upwardly relative to the container thereby to apply a force on the narrow end of the insertable attachment part. The force applied thereto causes the resilient insertable attachment part to bulge outwardly and seal against the outlet aperture of the container. The lever may suitably comprise a cam arrangement to provide the desired movement of the elongate member. Suitably locking means may be provided to lock the lever in a sealed position. The locking means may comprise a locking member which may be provided over the lever when in the sealed position. Alternatively, the lever may be adapted to self-lock when in the sealed position.

[0018] Conveniently, the insertable attachment part may be adapted to penetrate a portion of a container. Suitably, the insertable attachment part may comprise a penetrating part adapted to compromise the integrity of a container wall or a frangible portion of a container, e.g. a foil portion.

[0019] Preferably, the penetrating part is substantially elongate and is rotationally symmetrical about its longitudinal axis. Preferably, the penetrating part is substantially tapered from a wide end to a narrow end or point. For example, the penetrating part may be substantially ogival.

[0020] Suitably, the penetrating part may be narrow and spike-like to puncture the wall of a container or a frangible portion thereof, e.g. a foil portion, thereby to provide the outlet aperture in the container.

[0021] Preferably, the penetrating part defines the attachment conduit and comprises the attachment inlet and attachment outlet. Preferably, the wide end comprises the attachment outlet. Suitably, the attachment inlet may be disposed at the narrow end or point of the penetrating part.

[0022] Alternatively, the attachment inlet may be disposed around a surface of the elongate penetrating part to define one or more attachment inlets on the side of the penetrating part. Preferably, the delivery part connects with the penetrating part. Preferably, the attachment outlet of the penetrating part connects with the delivery inlet to define the fluidly continuous channel through the device from the attachment inlet to the delivery outlet.

[0023] The penetrating part suitably creates the outlet aperture in the container and attaches the delivery part to the container whilst connecting the delivery inlet of the delivery part to the container to allow flowable material to be delivered therefrom. Preferably, the penetrating part is adequately rigid to penetrate the wall of a container or a frangible portion thereof to provide the outlet aperture therein.

[0024] An insertable attachment part may include a penetrating part and an insert formation which may be provided discretely or by a single common structure.

[0025] An insertable attachment part may comprise suitable sealing means to provide an effective seal between the penetrating part and the outlet aperture in the container wall. Such sealing means may be similar to the sealing means of the insertable attachment part as described above. The sealing means may further comprise a sealing plate having an upper face and a lower face. The sealing means may comprise a washer which engages with the lower face of the sealing plate. The washer may seal the outlet aperture of the container and may engage with an inner or outer surface of the container. Suitably the lever may engage with and/or lock against the upper face of the sealing plate. Suitably one of the insert formation or penetrating part may comprise the sealing plate. Suitably the sealing plate may be made of a resilient material.

[0026] Suitably, the penetrating part may comprise securing means to ensure the penetrating part is securely attached within a container and, for example, in or on an outlet aperture. Suitably, the securing means may comprise a plurality of annular protrusions disposed around the penetrating part. The securing means may comprise a screw thread. Alternatively, the securing means may comprise one or more barb-like protrusions extending from the penetrating part to prevent the penetrating part detaching from the outlet aperture of the container. Conveniently, the securing means may comprise the sealing means. For example, the annular protrusions may se-

curely attach the insertable attachment part to the outlet aperture and also prevent material, e.g. liquid, leaking past an attachment part/outlet aperture interface to provide effective sealing means.

[0027] In one convenient disclosure, the first delivery part is elongate and defines a delivery conduit disposed along its length connecting a delivery inlet generally at a first end and a delivery outlet generally at a second end.

[0028] Preferably, the first delivery part comprises a cylindrical body portion.

[0029] Preferably, the body portion comprises a delivery shoulder, having a first face and second face, which annularly extends from the body proximal to the first end.

[0030] Optionally, in combination therewith, the first attachment part, in the form of an enclosure formation as above described, selectively engages with and attaches the first delivery part to the outlet aperture of the container by engaging with the shoulder to retain the first delivery part thereon. Preferably, the enclosure formation comprises an aperture to allow the enclosure formation to mount over the first delivery part and interface with the first face of the delivery shoulder. Where a screw cap is screwed or a deformable cap is stretched over the neck or collar of a container, the second face of the delivery shoulder may interface with a corresponding face of the container in the vicinity of the neck or collar to allow the cap to clamp the first delivery part to the container. Preferably, the first delivery part is clamped in sealing engagement to the container.

[0031] In another disclosure, a screw threaded first attachment part is provided together with an insertable first delivery part with respect to the first attachment part, and an insertable attachment part which comprises a screw thread proximal to a wide end thereof which corresponds to a screw thread of the first attachment part such as a screw cap. Where the penetrating part is required to open a container, e.g. a carton or pouch, or the insertable attachment part is required to attach the first delivery part to the neck or collar of a container, the first attachment part, e.g. screw cap, will generally not be required to attach around the neck of a container, e.g. screw neck of a bottle. Therefore, the screw thread in the screw cap may conveniently be utilised to attach the insertable attachment part to the first delivery part. The delivery shoulder of the first delivery part will be disposed between the screw cap and the wide end of the insertable attachment part and screwing the insertable attachment part into the screw cap will clamp the device together. Conveniently, a part of the screw thread around the wide end of the insertable attachment part may be used as the securing means to attach the device to the outlet aperture of the container, in a similar manner to the plurality of annular protrusions, as described above.

[0032] Suitably, as described above, the device may further comprise sealing means to seal the insertable attachment part to the container. Suitably, a body of the insertable attachment part comprises a through conduit having an internal thread corresponding to a screw

thread of the penetrating part of the insertable attachment part.

[0033] The sealing means may comprise actuation means to pull the insertable attachment part down on to the container to secure and seal the device thereon. The sealing means may comprise a sealing plate which engages with the container to seal the device thereon when the insertable attachment part is pulled thereagainst. Suitably the body of the insertable attachment part is slideably mounted to the sealing plate. Suitably the sealing plate comprises an aperture to allow the penetrating part to extend through the sealing plate to attach to the body of the insertable attachment part. The sealing plate suitably comprises one or more upwardly extending projections complementarily shaped with one or more recesses in the body of the insertable attachment part.

[0034] The actuation means may be adapted to urge the insertable attachment part in a direction outwardly from the container. The securing means, for example a screw thread, provided on the penetrating part will secure the penetrating part to the container whilst the actuation means will pull the sealing plate downwardly against the container. The container is suitably squeezed between the sealing plate and penetrating part thereby to securely clamp and seal the device to the container.

[0035] The actuation means may comprise one or more levers to actuate the sealing means. The levers are suitably adapted to engage with the sealing plate and move the sealing plate away from the body of the insertable attachment part and relative to the penetrating part. As described above, the levers may self-lock in a sealed position or a locking member may be provided on the device which is adapted to lock the levers in the sealed position. Suitably the locking member may be rotatable on the device and may be rotated over the levers thereby to lock them in the sealed position. Alternatively, the locking member may be fixed and the levers may be rotatable thereby to be rotated under the locking member when in the sealed position. Suitably, the levers are hingedly attached to the insertable attachment part. Suitably providing the levers with an eccentric or offset hinge axis will provide a camming arrangement to engage the levers with the sealing plate and provide a self-lock mechanism when in the sealed position. Suitably two levers are provided and preferably at 180 degrees relative to each other on the attachment part.

[0036] In a further alternative disclosure, where the cap is required to attach to a neck or collar of a container, the wide end of the insertable attachment part may comprise a screw thread which corresponds to a screw thread of the first delivery part allowing the insertable attachment part and first delivery part to be screwed together. The screw thread may project perpendicularly from the wide end of the insertable attachment part and correspond to a threaded bore in the first end of the first delivery part, or vice versa. When screwed together, the cap may suitably be clamped between the insertable attachment part and the first delivery part.

[0037] Alternatively, the cap aperture may allow the cap to be placed over the first delivery part and interface with the first face of the delivery shoulder thereby to clamp the device to the container when screwed to the neck or collar thereof, for example.

[0038] Preferably, the first delivery part comprises a projecting portion terminating in the delivery outlet to define a desired flow direction.

[0039] Suitably, the projecting portion may take many forms depending on its desired functionality. For example, the projecting portion may comprise a mouthpiece. The mouthpiece, which terminates at the delivery outlet, may be offset to the longitudinal axis of the delivery part. Such a mouthpiece may be shaped in a similar manner to a mouthpiece commonly used on a drinking bottle for training babies or toddlers, often known as a trainer cup, for example. Alternatively, the projecting portion may be adapted to provide a non-drip spout which may be particularly important where staining from spilled liquid after dispensing is extremely undesirable, such as when serving red wine in fine restaurants having white tablecloths. Alternatively, the projecting portion may comprise a teat suitable for feeding babies who are still at breast feeding age. Suitably, the teat may be anti-colic or may be adapted to provide a desired flow rate. The teat may be suitable for users with special needs, e.g. a cleft pallet, where the user is unable to suck on a conventional teat and requires the teat to be pressed to encourage a liquid, for example, to flow from the container into the mouth of the user. Further alternatively, the projecting portion may comprise an elongate straw-like projecting portion. Such a straw-like projecting portion may be suitable for people who are unable to drink independently. In a further embodiment, the delivery part may comprise a 'push-pull' valve which closes and seals the container when in the 'push' position and allows liquid to be delivered from the container when in the 'pull' position. Such a delivery part may be particularly suitable for participants of outdoor pursuits, e.g. cyclists or walkers. Alternatively, the projecting portion may comprise a shaker-type outlet which may be suitable for sprinkling powder or granular material in a cooking application, for example. Further alternatively, the projecting portion may serve as a delivery means in like manner to a funnel for delivering material to another container.

[0040] The first delivery part may suitably be adapted to receive a closure to seal the delivery outlet when not in use. The closure may screw over the delivery outlet or may be a bung-like member which screws or pushes into the delivery outlet to close and seal it. The closure may be connected to the delivery part by a flexible arm which allows the closure to be arranged in sealing engagement with the delivery outlet or be removed therefrom to open the delivery outlet, whilst conveniently being connected to the delivery part at all times.

[0041] Advantageously, the closure is thereby prevented from becoming detached from the first delivery part which could inconveniently result in misplacement. Suitably, the closure may comprise locking means to prevent

the delivery outlet being opened when undesired or to provide a degree of security to prevent unwanted access to the material within the container. A lockable and secure closure may be particularly desirable where the material is potentially harmful, e.g. a toxic chemical or medicine, and access thereto by certain people is often undesirable, such as children. Alternatively, the closure may seal the delivery outlet before the delivery part is attached to a container and only removed when delivery of material from the container is required. This advantageously provides a sealed container including the device which is resistant to contamination of the material therein prior to use, which may be particularly desirable in a medical environment, for example.

[0042] Suitably, the first delivery part may comprise a valve which prevents material leaving the delivery outlet when not required. A suitable valve may comprise a one-way valve, e.g. a ball valve. Such a delivery part may be particularly suitable to prevent material leaking from the delivery outlet when the container falls over or is accidentally dropped.

[0043] Suitably, the first delivery part may comprise pressure equalisation means to allow air into the container to replace the material leaving the container when being delivered therefrom. Pressure equalisation means conveniently tends to equalise air pressure within and outside the container during delivery of the material therefrom. This is particularly useful where the delivery part comprises a mouthpiece or straw and material is being sucked from the container. A reduced pressure in the container may cause the container wall to collapse and eventually delivery of the material may inconveniently cease. Suitably, the aeration means may comprise an air passageway disposed in the delivery part suitably adapted to fluidly connect the interior of the container with the atmosphere to prevent a substantial change occurring between atmospheric pressure and container pressure. Preferably, the air passageway is separate from the fluidly continuous conduit through the device.

[0044] Preferably, the first delivery part is a similar material to the first and/or further attachment part. A portion of the delivery part may be substantially flexible and a portion may be substantially rigid. For example, where the delivery part comprises a teat, the teat must be substantially flexible, as will be understood by a skilled person in the art, whereas a mouthpiece, similar to that found on a training cup for babies, must be substantially rigid. Preferably, the portion of the delivery part comprising the delivery shoulder is substantially rigid to adequately engage with the first attachment part, as described above.

[0045] Suitably, the device may comprise a handle to facilitate handling the container when the device is attached thereto. Suitably, the handle may attach to the first delivery part or first and/or further attachment part. Suitably, the handle may comprise first and second arms being joined together at one end. Preferably, the arms are angled relative to each other. Preferably, a free end of the handle attaches to the first delivery part or first

and/or further attachment part. Preferably, the first arm extends outwardly and substantially perpendicularly from the first delivery part or first and/or further attachment part and the second arm is orientated substantially perpendicularly relative to the first arm to define a handle having a right-angled profile.

[0046] Alternatively, the one or more levers of the sealing means, as described above, may provide a handle.

[0047] Preferably, the interchangeable delivery parts and attachment parts of the device are formed of the same material. Preferably, the device is a material of food-grade quality being suitable for sterilisation using known techniques. The parts may be supplied pre-sterilised. This is of particular importance where the device is used in a medical environment or by people who are easily susceptible to illness, e.g. babies. Suitable materials for the device may include rubber or plastic.

[0048] Preferably, the device is re-usable. However, the device may be disposable and/or recyclable.

[0049] Preferably, the device is substantially compact and portable which is particularly convenient for carrying on one's person, for example.

[0050] A kit of parts may comprise the device and suitable packaging for the device to be contained or stored in when not in use.

Suitably, one or more devices in accordance with the present invention may be contained in an assembled or disassembled state within the packaging. Preferably, the packaging is complementarily shaped with the device to provide compact packaging enveloping the device. Suitably, the packaging may be adapted to prevent the device moving around within the packaging. For example, the packaging may comprise one or more ribs extending inwardly from a packaging wall which are complementarily shaped with the device to ensure the device is securely contained therein. Preferably, the packaging comprises two parts which engage together to collectively envelope the device. The two parts of the packaging may engage and lock together at corresponding ends. Alternatively, the packaging may comprise a hinge and the two parts may engage and lock at corresponding edges. Preferably the packaging is an aesthetic design, having smooth contours, like an egg, for example.

[0051] An embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

- Figure 1 is a cross section through the device including the screw cap attachment part to attach the delivery part to a bottle having a screw neck in accordance with the present invention;
- Figure 2a is a cross section through the device including the insert attachment part to attach the delivery part to a bottle.
- Figure 2b is an exploded cross section of the device of Figure 2a;
- Figure 3a is a cross section through the device including the penetrating part to attach the delivery

- part to a carton;
- Figure 3b shows the device of Figure 3a attached to a carton;
- Figure 3c shows the device of Figure 3a attached to a pouch;
- Figure 3d shows an exploded cross section of the device of Figure 3a;
- Figure 3e shows an embodiment in accordance with the present invention and different from the embodiment of the device of Figure 3a;
- Figure 4a shows an exploded view of an embodiment not forming part of the invention having the sealing levers;
- Figure 4b shows the device of Figure 4a with the levers in the sealed position;
- Figure 4c shows the device of Figure 4a with the levers in the unsealed position; and
- Figure 5 shows the kit of parts including the device and packaging.

[0052] With reference to Figure 1, a delivery device 10 is provided comprising a delivery part 12 defining a delivery conduit 14 having a delivery inlet 16 and a delivery outlet 18. An attachment part 20 selectively engages with the delivery part 12 to act as a means to attach the delivery part 12 to an outlet aperture 22 of a liquid container 24, such as bottle 24. The attachment part 20 may be selected from a plurality of attachment parts depending on the form and structure of the container 24. For example, the container 24 may be a bottle, carton or pouch each formed differently and having different outlet apertures 22 and/or means of opening, e.g. cap, cork or frangible portion. The delivery part 12 may also be selected from a plurality of delivery parts depending on its desired function, e.g. to be suitable for pouring or drinking. The plurality of delivery parts 12 and attachment parts 20 are interchangeable providing a universal liquid delivery device 10.

[0053] One embodiment of the device 10 is shown in Figure 1. The delivery part 12 is substantially elongate and circular in cross section and comprises a mouthpiece including the delivery outlet 18. At its opposite end, the delivery part 12 has an annular shoulder 26 surrounding the delivery inlet 16. The attachment part 20 is a screw cap 20 having a circular cover 28 and a radial wall 30 extending from the cover 28 which is threaded allowing the cap 20 to attach in sealing engagement around the neck 23 or collar of a container, such as the bottle 24, having a corresponding screw thread 34. An aperture 32 is disposed centrally in the cover 28 and is complementarily shaped with the delivery part 12 to allow the screw cap 20 to fit over the delivery part 12 and abut against a first face 36 of the annular shoulder 26. The screw cap 20 clamps the delivery part 12 to the neck 23 or collar of the container 24.

[0054] In an alternative embodiment, the cap 20 may be a deformable cap wherein the radial wall 30 is elastically deformable allowing it to stretch over the neck 23

or collar of a container 24 to attach the delivery part 12 thereto in a similar clamping manner.

[0055] A further embodiment is shown in Figures 2a and 2b. The attachment part in this embodiment is an insert 38 which is slidably inserted into the neck 23 of a container 24, such as bottle, to be in sealing engagement with the outlet aperture 22, defined by the neck 23, and attach the delivery part 12 thereto. The insert 38 is rotationally symmetrical about its longitudinal axis 39 and defines a centrally disposed attachment conduit 40 having an attachment inlet 42 and attachment outlet 44. As shown in Figure 2b, the insert 38 has a screw thread 47 projecting axially from an insert face 46 which corresponds with a threaded hole 48 disposed axially in the delivery part 12. The projecting screw thread 47 includes the attachment outlet 44. The insert 38 screws into the delivery part 12 until a second face 37 of the annular shoulder 26 abuts with the insert face 46. The insert 38 is thereby engageable with the delivery part 12 to define a fluidly continuous conduit 40, 14 through the device 10 from the attachment inlet 42 to the delivery outlet 18. Alternatively, the projecting screw thread 47 may be disposed on the delivery part 12 and the threaded hole 48 may be disposed in the insert 48 and comprise the attachment outlet 44. The insert 38 may be rubber or plastic to provide an effective seal between the insert 38 and the neck 23 of the container 24. The insert 38 may rely on friction and the resilience of the rubber or plastic to securely attach the delivery part 12 to the container 24. Alternatively, as shown in Figure 2c, the screw cap 20 (or deformable cap) may be used to clamp the annular shoulder 26 of the delivery part 12 to the neck 23 or collar of the container 24.

[0056] A further embodiment is shown in Figures 3a to 3d. The attachment part in this embodiment is a penetrating part 50 which may be used to compromise the integrity of a frangible portion of a container 24, such as a foil portion of a carton or pouch. The penetrating part 50 is rotationally symmetrical about its axis 51 and substantially ogival in cross section, tapering from a wide end 52 to a narrow or pointed end 54. The penetrating part 50 defines the attachment conduit 40 wherein the attachment outlet 44 is disposed at the wide end 52 and two attachment inlets 42 are disposed near the narrow end 54 along the penetrating part 50. The pointed end 54 of the penetrating part 50 is used to puncture a frangible portion of a container 24 to provide an outlet aperture 22 in the container 24 for the device 10 to attach to. The container 24 may be a carton as shown in Figure 3b or a pouch as shown in Figure 3c. The frangible portion of the container 24 may be a foil portion disposed on the top of the carton or the side of the pouch and the penetrating part 50 is used to puncture the foil portion to create the outlet aperture 22 in the container 24. Once inserted into the outlet aperture 22, the annular shoulder 26 of the delivery part 12 abuts against the container wall 25 in the vicinity of the outlet aperture 22 to provide a stop preventing the device 10 being pushed entirely into the con-

tainer 24. With the device 10 attached to the outlet aperture 22, the container 24 can be squeezed or tilted to encourage the liquid therein to enter the attachment inlets 42 and flow through the fluidly continuous conduit 40, 14 through the device 10 to exit the delivery outlet 18 of the delivery part 12. Alternatively, the liquid may be sucked from the container 24 via the delivery part 12. A hole 60 may be disposed in the container wall 25 distal from the outlet aperture 22 to provide aeration means to ensure air can enter the container 24 and replace the liquid being delivered therefrom. Suitable aeration means 60 prevents a vacuum forming within the container 24 when liquid is being delivered therefrom, as will be understood by a person skilled in the art.

[0057] As shown in Figure 3d, the penetrating part 50 has a screw thread 56 projecting from a face 58, which corresponds to the threaded hole 48 disposed axially in the delivery part 12. The projecting screw thread 56 includes the attachment outlet 44. The penetrating part 50 screws into the delivery part 12 until the second face 37 of the annular shoulder 26 abuts with the face 58 of the penetrating part 50. The penetrating part 50 is thereby engageable with the delivery part 12 to define a fluidly continuous conduit 40, 14 through the device 10 from the attachment inlets 42 to the delivery outlet 18. Alternatively, the projecting screw thread 47 may be disposed on the delivery part 12 and the threaded hole 48 may be disposed in the penetrating part 50 and comprise the attachment outlet 44. The penetrating part 50 further includes annular protrusions 62 to provide a means of security to the container wall 25 when inserted in the outlet aperture 22 of the container 24. The annular protrusions 62 also provide an effective seal between the outlet aperture 22 and the penetrating part 50.

[0058] Further alternatively, the annular protrusions 62 may be a screw thread 64 disposed around the penetrating part 50. The screw thread 64 may conveniently provide the securing and sealing means, as described above, or may be utilised to connect the penetrating part 50 to the delivery part 12, as shown in Figure 3e. In this later case, the screw thread 64 corresponds with the screw cap 20 to allow the screw cap 20 to clamp the delivery part 12 by its annular shoulder 26 to the face 58 of the penetrating part 50. When the penetrating part 50 is inserted into the outlet aperture 22, the edge 66 of the radial wall 30 provides the stop to prevent the device 10 being pushed entirely into the container 24.

[0059] As described above the delivery part 12 is selected from a plurality of delivery parts depending on the desired functionality. For example, the delivery part 12 can include a spout, mouthpiece or teat or other structure, as described above. In a similar manner, the attachment part 20/21/38/50 is selected from a plurality of attachment parts depending on the structure and form of the container 24 from which liquid is to be delivered. As described above, the attachment part 20/21/38/50 may include one or more of the screw cap 20, deformable cap 21, insert 38 and penetrating part 50. The selected delivery part 12

and attachment part 20/21/38/50 are therefore interchangeable depending on the desired application for the device 10.

[0060] Figures 4a to 4c show a preferred embodiment of the invention. The device (10) includes a cylindrical body (80) having an upper end comprising an external thread (82) and a lower end slideably mountable to a sealing plate (84). The plate (84) has two upwardly extending projections (83) which slideably insert into corresponding recesses (not shown) in the lower end of the body (80). The plate (84) also has a downwardly extending portion (85) having an aperture (187) extending there-through.

[0061] The thread (82) corresponds with a threaded cap (81) having an aperture (79) in its upper portion. A dispensing part (86), shown as a teat, is clamped between the cap (81) and the body (80) when the cap (81) is screwed on to the body (80). Of course, in accordance with the invention, the teat may take the form of another dispensing part, e.g. a mouthpiece or a spout.

[0062] To attach the delivery part (86) to a container, a tapered penetrating part (88) is attached to the body (80). The penetrating part (88) has a narrow pointed end (89) and a wide end (90) having a screw thread (91). A wide pitched screw thread (87) is provided around a lower portion of the penetrating part (88) which engages with the container, such as a carton, to secure the device (10) thereto. An annular shoulder is provided by an intermediate portion (92) of the penetrating part (88). The wide threaded end (90) of the penetrating part (88) passes through the sealing plate (84) and screws into the lower end of the body (80), thereby to securely attach the penetrating part (88) to the body (80).

[0063] The penetrating part (88) has a conduit extending from a plurality of inlets (191) to an outlet at the wide end (90). When the device (10) is assembled together, a continuous flow conduit is provided through the device from the inlets (191) to the delivery outlet (93) of the teat (86).

[0064] Two levers (94) are hingedly attached to the body (80). The axis of rotation of each lever (94) is offset to provide a cam effect when the levers are actuated. When the levers (94) are moved from an unsealed position (as shown in Figure 4c) to a sealed position (as shown in Figure 4b), an engaging surface of each lever (94) engages with the sealing plate (84) to force the sealing plate (84) against the container. This action causes the body (80) and the penetrating part (88) to be pulled upwardly from the container. The body (80) is guided by and slideably moved upwardly on the upwardly extending projections (83) of the sealing plate (84). As the screw thread (87) secures the penetrating part (88) to the container, such as a carton, the container wall is effectively squeezed between the penetrating part (88) and the sealing plate (84) thereby to securely clamp the device (10) to the container. A seal (not shown) may be provided to seal the interface between the device (10) and the container and may engage with the sealing plate (84). The

seal may seal the interface from inside and/or outside the container wall.

[0065] With reference to Figure 5, the interchangeable parts are contained within suitable packaging 72, 74 to provide a kit 70 including the device 10 and the packaging 72, 74. The packaging 72, 74 provides a convenient means for storing and transporting the device 10 in an assembled or disassembled state, when not in use. The packaging 72, 74 is compact and neatly envelops the device 10. The packaging 72, 74 may include two parts 72, 74 which are substantially ogival in cross section defining an inner volume for the device 10. The two parts 72, 74 connect and lock together at their corresponding openings 76, 78 and split apart when the device 10 is to be removed from the packaging 70. The two parts 72, 74 may include ribs or clips (not shown) on their inner surfaces which are complimentary in shape with the device 10 to ensure the device 10 is securely packaged and is prevented from moving around within the packaging 72, 74. As described above, the kit 70 may also include a handle (not shown) to facilitate handling the container 24 when the device 10 is attached thereto, which may attach to the delivery part or attachment part and which may also be contained in the packaging 72, 74. The device 10 and packaging 70 is a plastics material which is suitable for sterilisation and recycling.

Claims

1. A liquid delivery device (10) comprising:

a first delivery part (12) comprising an annular shoulder (26) and defining a delivery conduit having a delivery inlet (16) and a delivery outlet (18), wherein the annular shoulder (26) surrounds the delivery inlet (16);

a first attachment part (20) adapted to selectively engage with the annular shoulder (26) of the first delivery part (12) and to attach the first delivery part (12) to an outlet aperture of a first liquid container, wherein the first attachment part (20) is a screw cap (20) having a circular cover (28) in which is disposed centrally an aperture (32) complementarily shaped with the first delivery part (12) to allow the screw cap (20) to fit over the first delivery part (12) and abut against a first face (36) of the annular shoulder (26), the screw cap (20) further comprising a first screw thread corresponding to a screw thread of the first liquid container; and

a further attachment part (50) differently conformed to the first attachment part (20) and adapted to attach the first delivery part (12) to an outlet aperture of a further liquid container differently formed to the first liquid container, wherein

the further attachment part (50) is a penetrating part (50) to compromise the integrity of a wall of the further liquid container or a frangible portion of the further liquid container to provide the outlet aperture therein, the penetrating part (50) tapers from a wide end (52) to a narrow end (54) and defines an attachment conduit (40) having an attachment outlet (44) disposed at the wide end (52) and at least one attachment inlet (42) disposed proximal the narrow end (54), **characterized in that** the penetrating part (50) comprises a further screw thread (64) disposed proximal to the wide end (52) of the penetrating part (50), and wherein the first screw thread of the screw cap (20) corresponds to the further screw thread (64) to allow the screw cap (20) to clamp the first delivery part (12) by its annular shoulder (26) to a face (58) of the penetrating part (50) and define a fluidly continuous channel through the liquid delivery device from the at least one attachment inlet (42) to the delivery outlet (18).

2. The device (10) according to claim 1, wherein the screw cap (20) comprises an annular wall portion (30) peripherally extending perpendicularly from said cover (28), and define a fluidly continuous channel from the first liquid container to the delivery outlet of the delivery conduit.

3. The device (10) according to claim 1 or 2, wherein the further screw thread (64) of the penetrating part (50) forms annular protrusions (62) to provide an effective seal between the penetrating part (50) and the outlet aperture provided in the further liquid container, and to securely attach the penetrating part (50) to the further liquid container (24).

4. The device according to any preceding claim, wherein the first delivery part (12) is selectable from a plurality of delivery parts comprising a teat, a spout, and a mouthpiece.

5. The device according to any preceding claim, wherein the at least attachment inlet (42) comprises a plurality of attachment inlets (42) disposed along the penetrating part (50).

Patentansprüche

1. Flüssigkeitszuführungsvorrichtung (10), umfassend:

einen ersten Zuführungsteil (12), der eine ringförmige Schulter (26) umfasst und eine Zuführungsleitung mit einem Zuführungseinlass (16) und einem Zuführungsauslass (18) definiert, wobei die ringförmige Schulter (26) den Zuführungseinlass (16) umgibt;

einen ersten Befestigungsteil (20), der dafür ausgelegt ist, selektiv mit der ringförmigen Schulter (26) des ersten Zuführungsteils (12) in Eingriff zu treten und den ersten Zuführungsteil (12) an einer Auslassöffnung eines ersten Flüssigkeitsbehälters zu befestigen, wobei der erste Befestigungsteil (20) eine Schraubkappe (20) mit einer kreisförmigen Abdeckung (28) ist, in der mittig eine Öffnung (32) angebracht ist, die komplementär zu dem ersten Zuführungsteil (12) geformt ist, um zu ermöglichen, dass die Schraubkappe (20) über den ersten Zuführungsteil (12) passt und gegen eine erste Fläche (36) der ringförmigen Schulter (26) stößt, wobei die Schraubkappe (20) weiter ein erstes Schraubgewinde umfasst, das einem Schraubgewinde des ersten Flüssigkeitsbehälters entspricht; und

einen weiteren Befestigungsteil (50), der anders an den ersten Befestigungsteil (20) angepasst und dafür ausgelegt ist, den ersten Zuführungsteil (12) an einer Auslassöffnung eines weiteren Flüssigkeitsbehälters zu befestigen, der anders ausgebildet ist als der erste Flüssigkeitsbehälter, wobei

der weitere Befestigungsteil (50) ein eindringender Teil (50) ist, um die Integrität einer Wand des weiteren Flüssigkeitsbehälters oder eines zerbrechlichen Abschnitts des weiteren Flüssigkeitsbehälters zu beeinträchtigen, um die Auslassöffnung darin bereitzustellen, wobei sich der eindringende Teil (50) von einem breiten Ende (52) zu einem schmalen Ende (54) hin verjüngt und eine Befestigungsleitung (40) mit einem am breiten Ende (52) angebrachten Befestigungsauslass (44) und wenigstens einem proximal dem schmalen Ende (54) angebrachten Befestigungseinlass (42) definiert, **dadurch gekennzeichnet, dass** der eindringende Teil (50) ein weiteres, proximal zu dem breiten Ende (52) des eindringenden Teils (50) angebrachtes Schraubgewinde (64) umfasst, und wobei

das erste Schraubgewinde der Schraubkappe (20) dem weiteren Schraubgewinde (64) entspricht, um es zu ermöglichen, dass die Schraubkappe (20) das erste Zuführungsteil (12) an seiner ringförmigen Schulter (26) an eine Fläche (58) des eindringenden Teils (50) klemmt und einen fluidisch kontinuierlichen Durchlass durch die Flüssigkeitszuführungs- vorrichtung von der wenigstens einen Befestigungseinlass (42) zum Zuführungsauslass (18) definiert.

2. Vorrichtung (10) nach Anspruch 1, wobei die Schraubkappe (20) einen ringförmigen Wandabschnitt (30) umfasst, der sich umlaufend senkrecht von der Abdeckung (28) erstreckt, und einen fluidisch kontinuierlichen Durchlass von dem ersten Flüssigkeitsbehälter zum Zuführungsauslass

der Zuführungsleitung definiert.

3. Vorrichtung (10) nach Anspruch 1 oder 2, wobei das weitere Schraubgewinde (64) des eindringenden Teils (50) ringförmige Ausbuchtungen (62) bildet, um eine wirksame Abdichtung zwischen dem eindringenden Teil (50) und der in dem Flüssigkeitsbehälter bereitgestellten Auslassöffnung bereitzustellen, und um den eindringenden Teil (50) sicher an dem weiteren Flüssigkeitsbehälter (24) zu befestigen.
4. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei der erste Zuführungsteil (12) auswählbar ist aus einer Vielzahl von Zuführungsteilen, umfassend einen Sauger, einen Ausgießer und ein Mundstück.
5. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei der wenigstens eine Befestigungseinlass (42) eine Vielzahl von entlang dem eindringenden Teil (50) angebrachten Befestigungseinlässen (42) umfasst.

25 Revendications

1. Dispositif de distribution de liquide (10), comprenant :

une première pièce de distribution (12) comprenant un épaulement annulaire (26) et définissant un conduit de distribution possédant une entrée de distribution (16) et une sortie de distribution (18), dans lequel l'épaulement annulaire (26) entoure l'entrée de distribution (16) ;

une première pièce de fixation (20) adaptée pour, sélectivement, se solidariser avec l'épaulement annulaire (26) de la première pièce de distribution (12) et fixer la première pièce de distribution (12) à un orifice de sortie d'un premier contenant de liquide, dans lequel la première pièce de fixation (20) est une capsule à vis (20) possédant un couvercle circulaire (28) dans lequel est disposé, au centre, un orifice (32) de forme complémentaire à celle de la première pièce de distribution (12) pour permettre à la capsule à vis (20) de s'ajuster au-dessus de la première pièce de distribution (12) et de venir en butée contre une première face (36) de l'épaulement annulaire (26), la capsule à vis (20) comprenant en outre un premier filetage correspondant à un filetage du premier contenant de liquide ; et

une pièce de fixation supplémentaire (50) conformée différemment de la première pièce de fixation (20) et adaptée pour fixer la première pièce de distribution (12) à un orifice de sortie d'un contenant de liquide supplémentaire formé

différemment du premier contenant de liquide,
dans lequel

- la pièce de fixation supplémentaire (50) est une pièce de pénétration (50) destinée à compromettre l'intégrité d'une paroi du contenant de liquide supplémentaire ou d'une partie rupturable du contenant de liquide supplémentaire pour créer l'orifice de sortie dans celui-ci, la pièce de pénétration (50) s'amincit depuis une extrémité large (52) vers une extrémité étroite (54) et définit un conduit de fixation (40) possédant une sortie de fixation (44) disposée au niveau de l'extrémité large (52) et au moins une entrée de fixation (42) disposée à proximité de l'extrémité étroite (54), **caractérisé en ce que** la pièce de pénétration (50) comprend un filetage supplémentaire (64) disposé à proximité de l'extrémité large (52) de la pièce de pénétration (50), et dans lequel le premier filetage de la capsule à vis (20) correspond au filetage supplémentaire (64) pour permettre à la capsule à vis (20) de serrer la première pièce de distribution (12) par son épaulement annulaire (26) à une face (58) de la pièce de pénétration (50) et définit un canal en communication fluide continue à travers le dispositif de distribution de liquide depuis la au moins une entrée de fixation (42) jusqu'à la sortie de distribution (18).
2. Dispositif (10) selon la revendication 1, dans lequel la capsule à vis (20) comprend une partie de paroi annulaire (30) se déployant de manière périphérique perpendiculairement audit couvercle (28), et définissant un canal en communication fluide continue depuis le premier contenant de liquide jusqu'à la sortie de distribution du conduit de distribution.
3. Dispositif (10) selon la revendication 1 ou 2, dans lequel le filetage supplémentaire (64) de la pièce de pénétration (50) forme des saillies annulaires (62) pour fournir un joint efficace entre la pièce de pénétration (50) et l'orifice de sortie prévu dans le contenant de liquide supplémentaire, et pour fixer de façon sécurisée la pièce de pénétration (50) au contenant de liquide supplémentaire (24).
4. Dispositif selon l'une quelconque des revendications précédentes, dans lequel la première pièce de distribution (12) peut être sélectionnée parmi une pluralité de pièces de distribution, comprenant une tétine, un bec verseur et un embout.
5. Dispositif selon l'une quelconque des revendications précédentes, dans lequel la au moins une entrée de fixation (42) comprend une pluralité d'entrées de fixation (42) disposées le long de la pièce de pénétration (50).

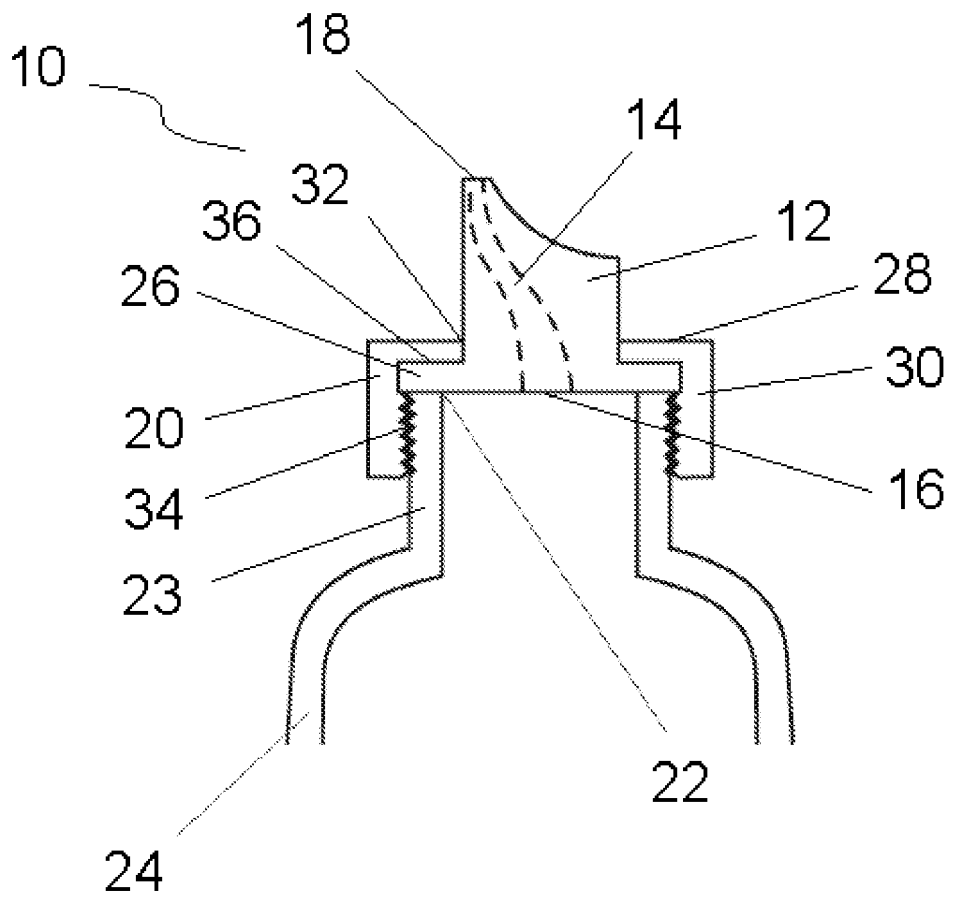


Figure 1

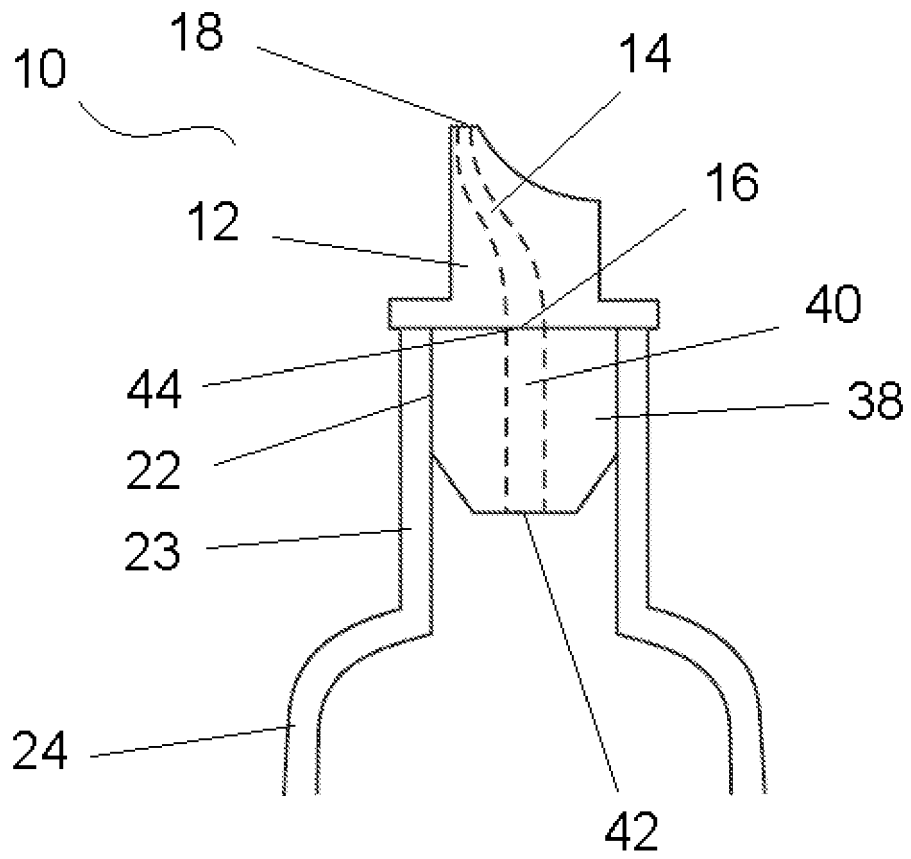


Figure 2a

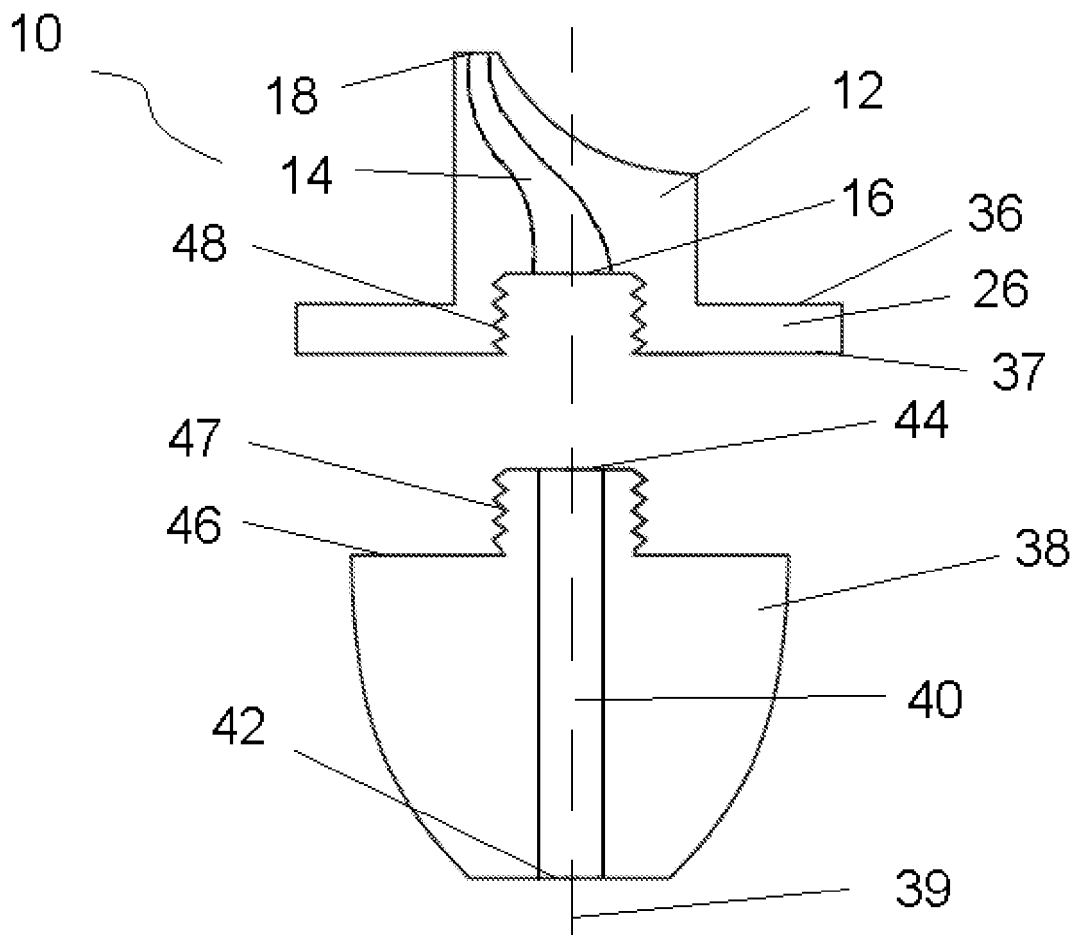


Figure 2b

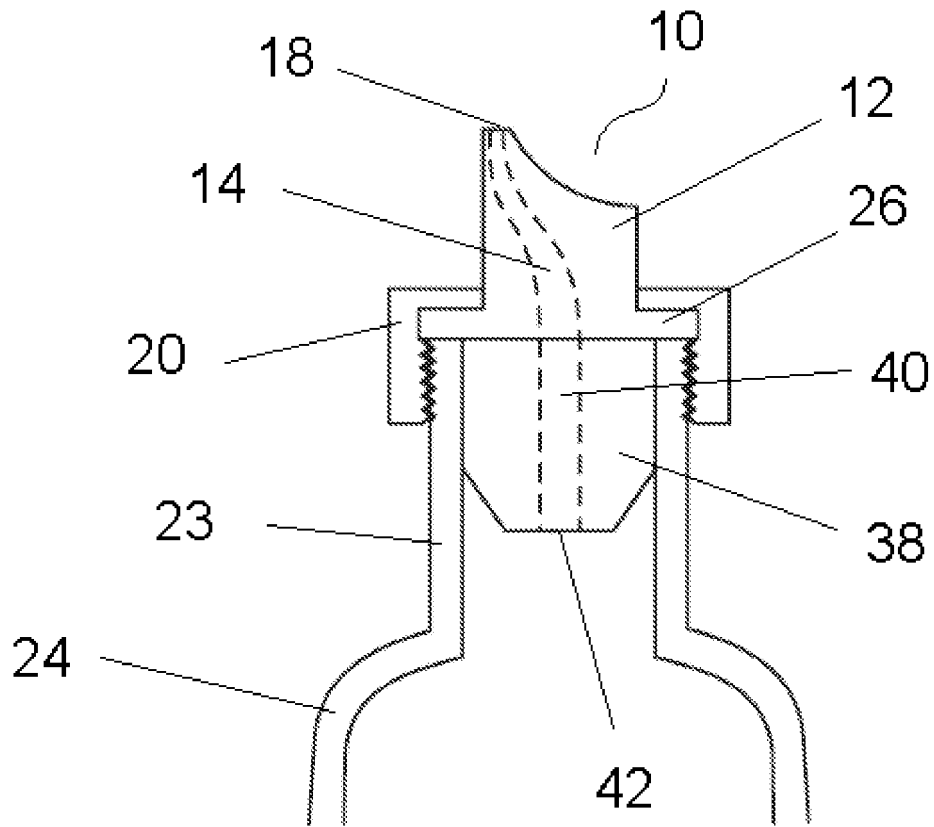


Figure 2c

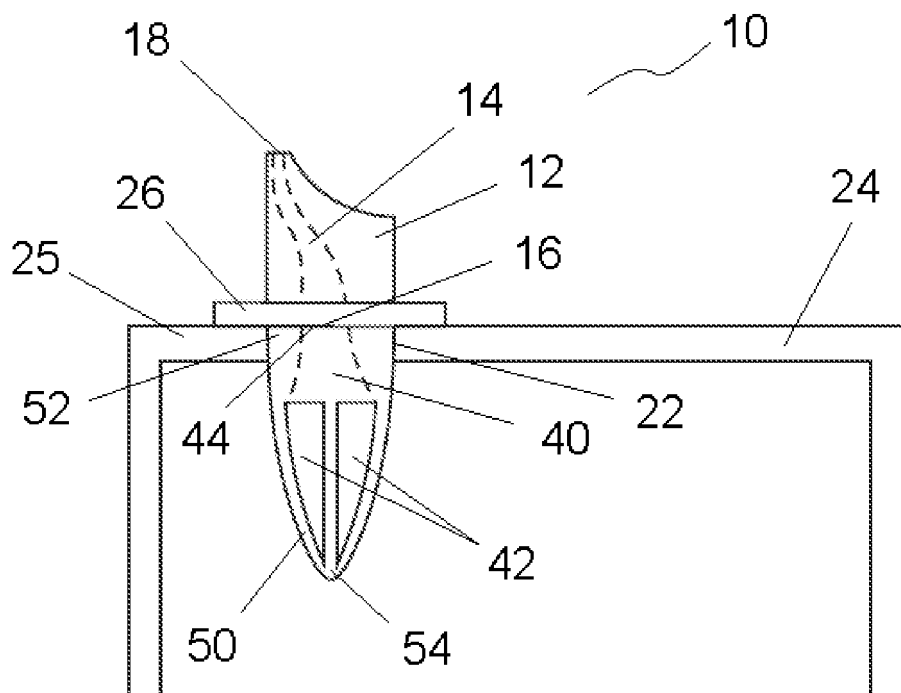


Figure 3a

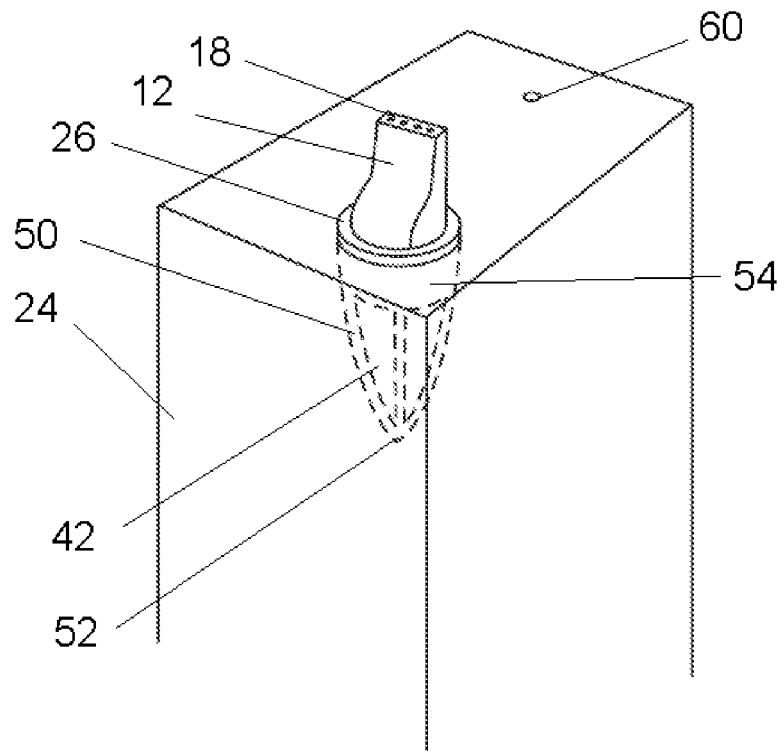


Figure 3b

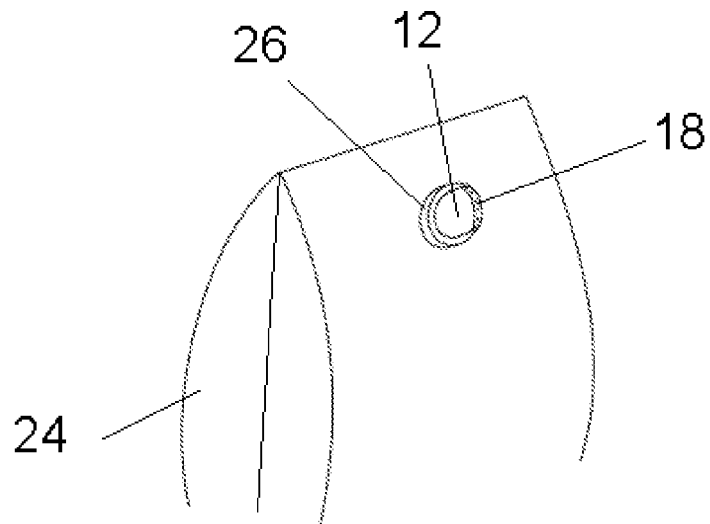


Figure 3c

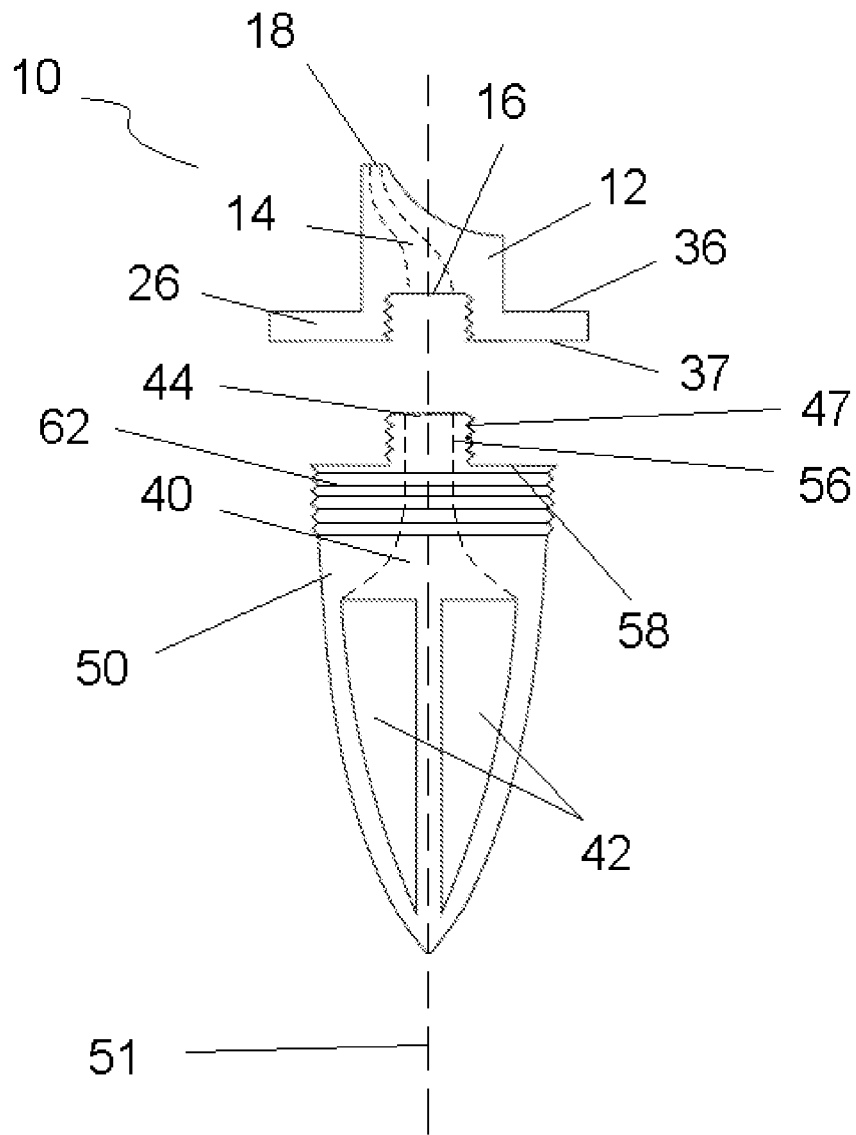


Figure 3d

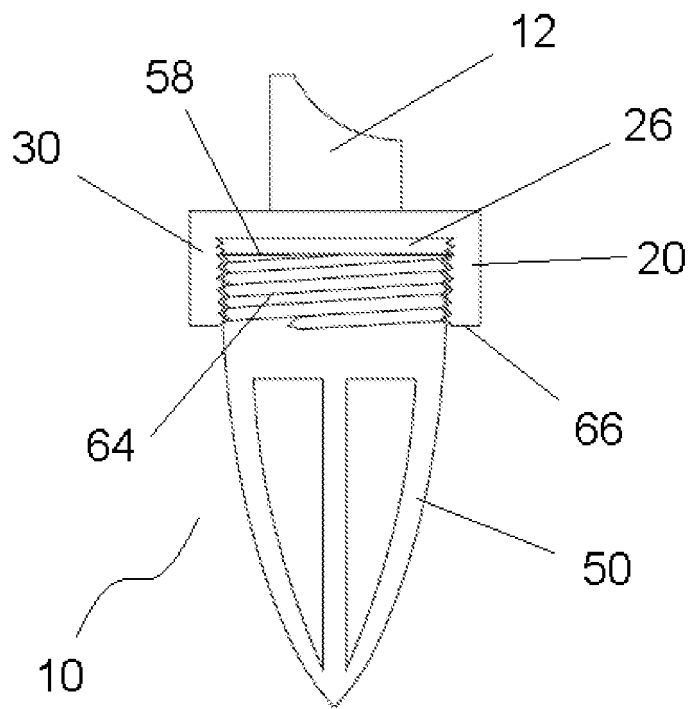


Figure 3e

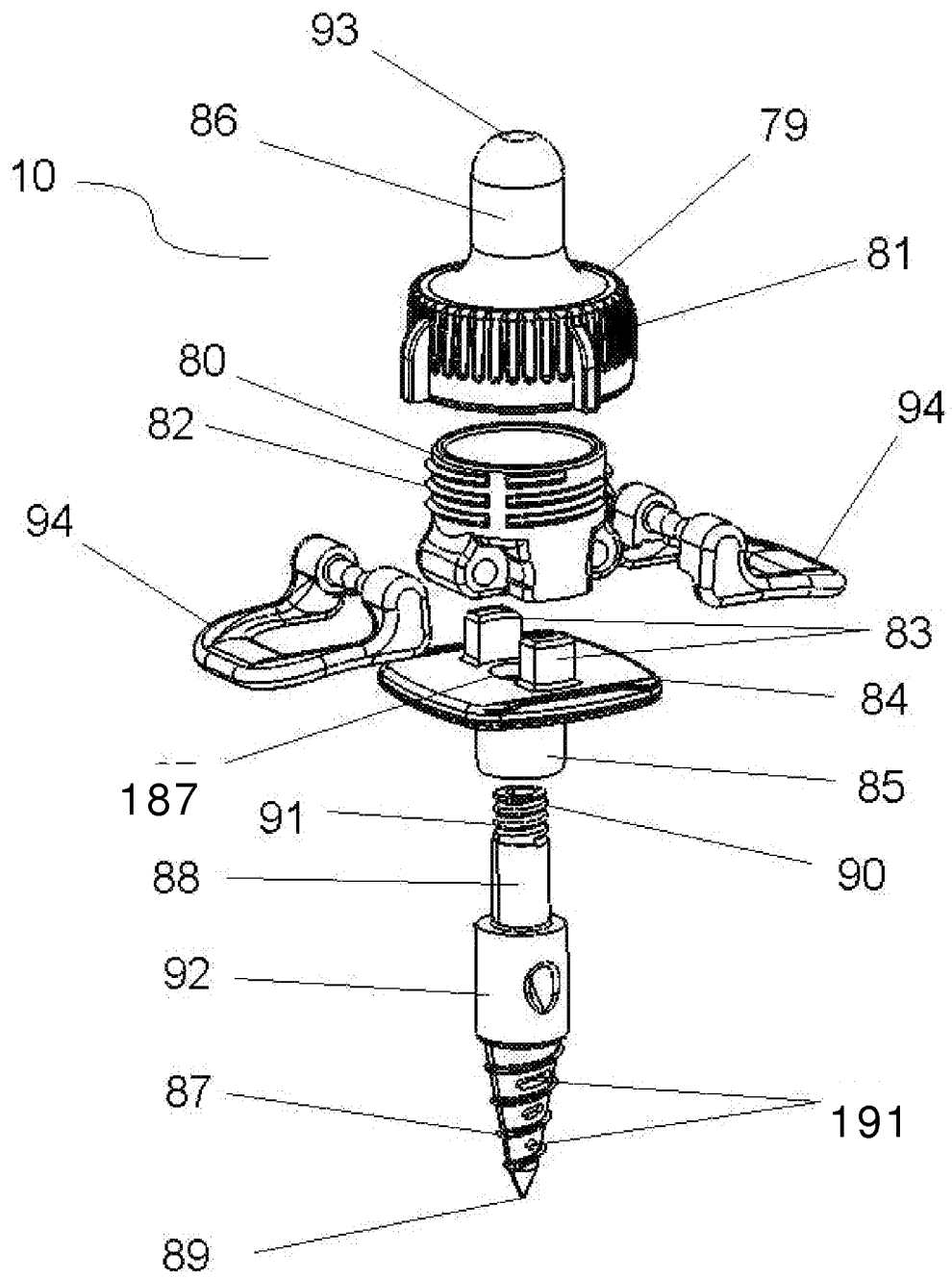


Figure 4a

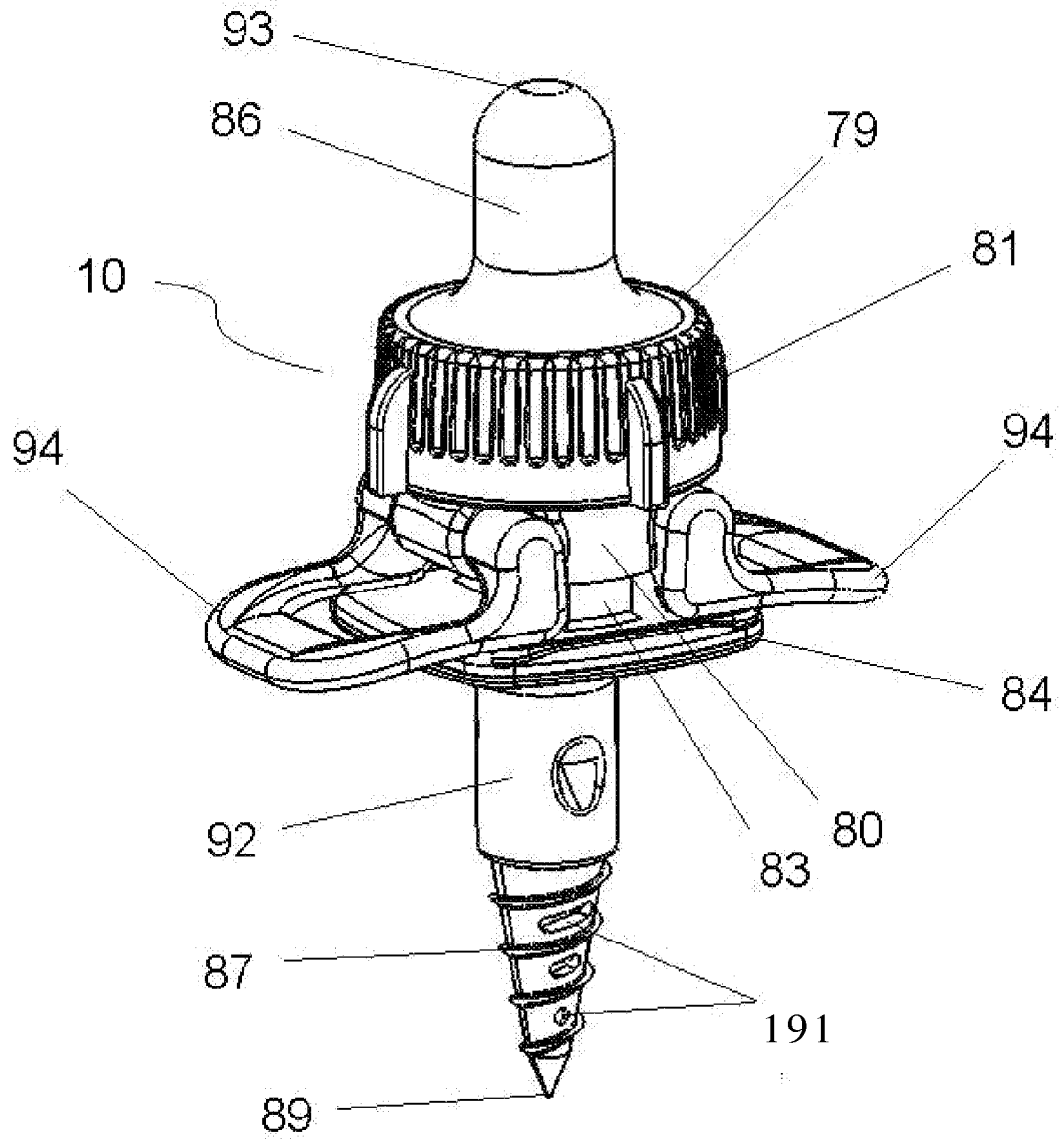


Figure 4b

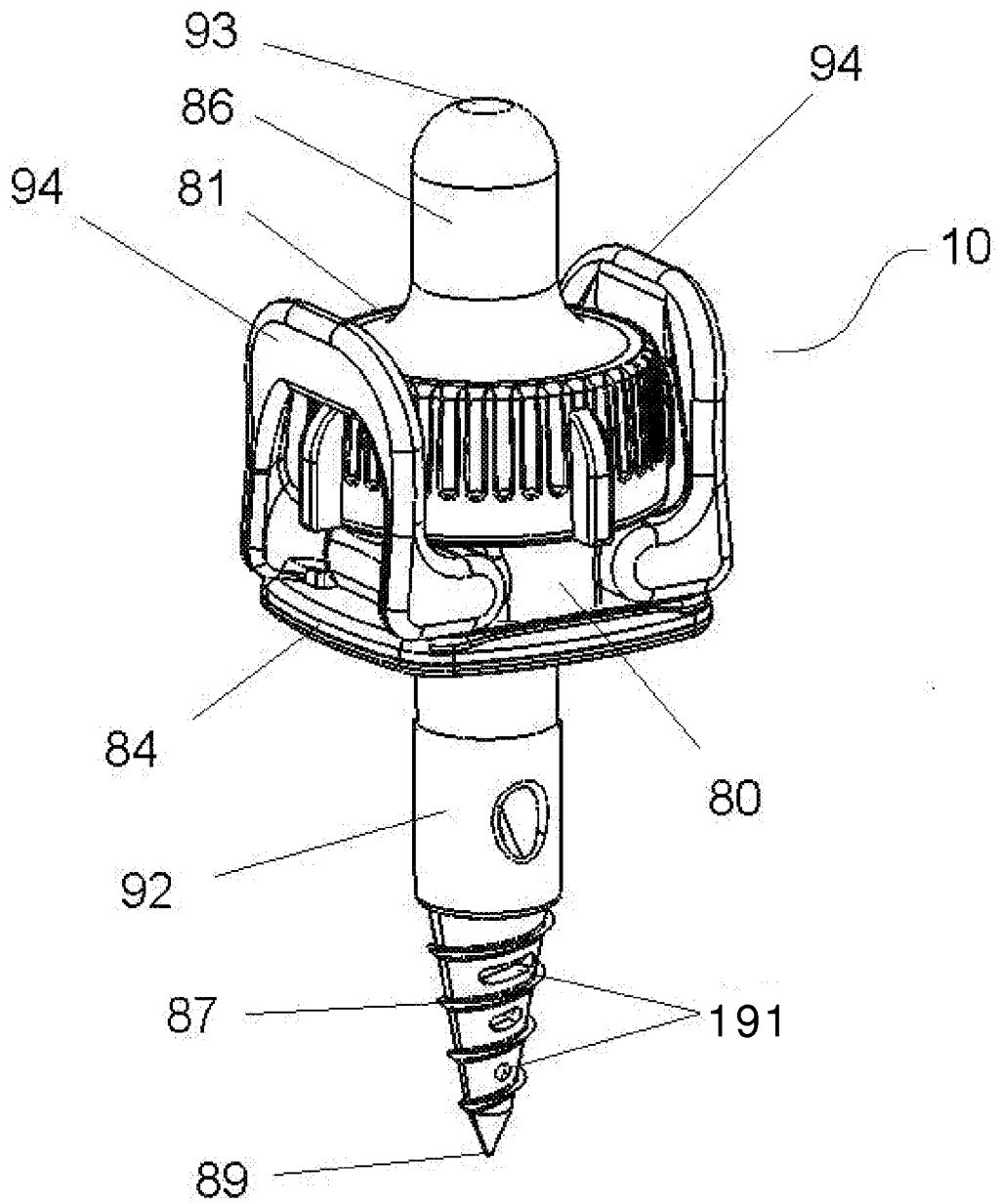


Figure 4c

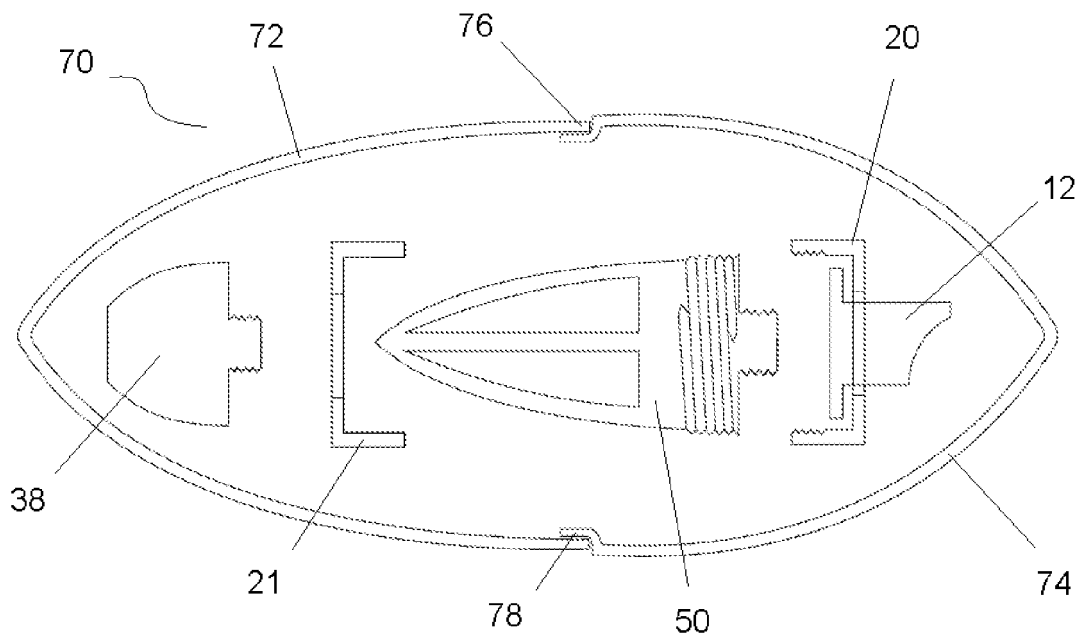


Figure 5

REFERENCES CITED IN THE DESCRIPTION

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