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(54) **PRECISION DISPENSER FOR VISCOUS MATERIALS**

(57) A precision dispenser (100) for viscous materials (101), configured to receive a container (130) for viscous materials, a sealing cap (200) for sealing a dispensing tip of the container, a refilling station for refilling a container for viscous materials suitable for use with the precision dispenser, and an actuating device (15) for use with the precision dispenser.

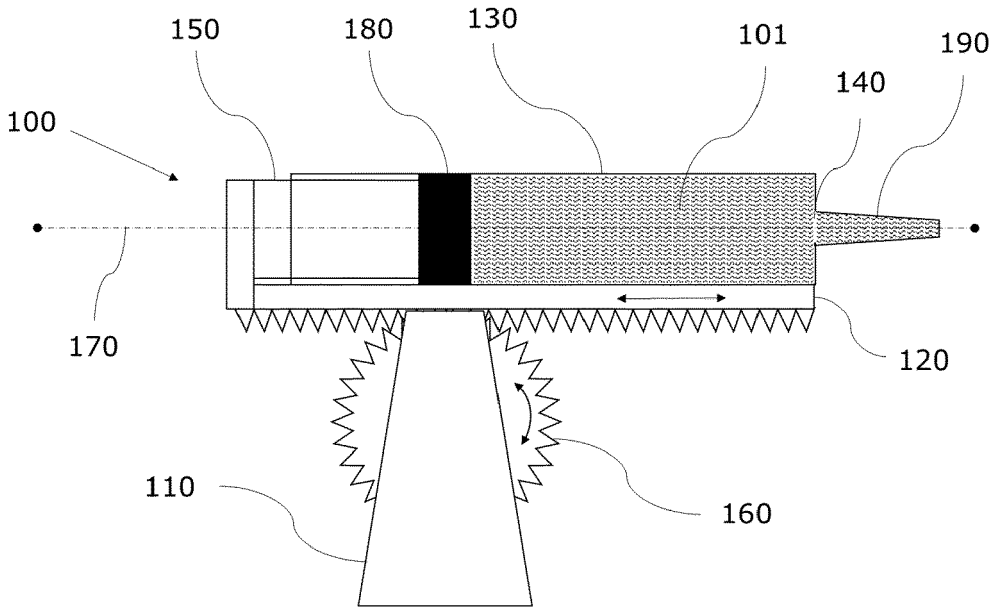

Fig. 1

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Description

[0001] The present invention belongs to the field of dispensers for viscous materials, and in particular to precision dispensers for viscous materials.

[0002] Viscous materials or compositions are often utilized in carpentry, upholstery, musical instruments, jewellery, pottery or any other object-making craft and artisanship that might require one or more of gluing, polishing, impregnating, sanding, lubricating or any combination thereof. Any of these processes when executed by hands require precise delivery of any of those viscous materials to the craft item or object to undergo any of the listed actions.

[0003] As it is often the case, precise dispensing of viscous materials to a carved groove, a surface, or any external or internal feature of a craft item or object may have to be carried out while holding the object in place or with a hand, in particular with one hand, for example also while operating machines or devices to gently but steadily move or turn the item, so that a uniform amount of the viscous material may be deposited during the gentle but steady movement of the item.

[0004] It may be therefore beneficial that the delivery of viscous material be carried out with one hand, while the other hand may be used in the holding or moving of the object.

[0005] Moreover, it may be necessary to carry out the delivery of the viscous materials to several items of the same kind in a reliable and consistent way, when operating in a chain production of craft items that require individual application of viscous materials by hand.

[0006] An additional need is therefore that the amount of viscous material is sufficient and that a rapid system for refilling the expiring material or replacing a container containing the viscous material is reliably set in place.

[0007] Further challenges, when working with viscous materials such as glue or oil, arise if humidity and temperature control in the environment is not straightforward or carried out efficiently or consistently, leading to rapid desiccation, oxidation, contamination or degradation of the materials and their primary qualities when the delivery is not smooth, or the dispensing means not adequate, or the storage of leftover material in a container or dispenser is not adequate. An incorrect dispensing or dispensing tools, means, or device may cause delivery and storing errors, leading to the consequent disposal of the altered viscous materials, now unusable, with loss of time and money for replacing the unusable materials and often the entire dispensing equipment affected by the adverse environmental conditions.

[0008] The present invention aims to, at least partially, overcome the problems of the prior art, by providing a precision dispenser for viscous materials, configured to receive a container for viscous materials, a sealing cap for sealing a dispensing tip of the container, a refilling station for refilling a container suitable for use with the precision dispenser, and an actuating device for use with the precision dispenser.

[0009] The scope of the invention is set out in the appended claims.

[0010] In a first embodiment of the present invention a precision dispenser for a viscous material is provided, comprising: an actuating device having a handle, a linear guide for receiving a container for viscous material, the linear guide being mechanically connected to the handle, and an activating mechanism, wherein the container comprises an outlet opening and means for releasing and recalling the viscous material from the container, and wherein the means for releasing and recalling the viscous material are configured for being connected to the linear guide by the activating mechanism, wherein the activating mechanism forms a form-fit and/or force-fit connection with the linear guide to provide a bidirectional linear motion to the linear guide.

[0011] According to the present invention a precision dispenser for a viscous material is intended as a device to precisely deliver the viscous material to an item, object, craft object, and in particular to a surface or structural feature thereof, or to a surface, such as a wall, or a floor, or to any structural feature thereof.

[0012] A viscous material is intended according to the present invention as a liquid which is thick and does not flow easily, even when subjected to gravity. A viscous material may flow upon pushing it through a confined space, such as a container, having an outlet opening, so that the material may then flow through that opening forming an orderly structured shape which can be retained when outside of the confined space, such as a drop or a line. According at least to the pressure exercised to push the viscous material to flow through a confined space, to the viscosity of the material, and to the cross-section of the opening, the delivery of the viscous material may be controlled in amount and speed, so that the lateral dimensions of the drop or line may range within a predetermined or preferred range of lateral dimensions. A viscous material according to the present invention may be a chemical composition such as glue or oil having a viscosity within a predetermined range of viscosities.

[0013] In particular, according to a further embodiment of the present invention, the viscous material may have a viscosity in a range from 800 to 25000 cP (mPa*s) at 25°C, and preferably between 2000 to 20000 cP (mPa*s) at 25°C, and most preferably between 7000 and 15000 cP (mPa*s) at 25°C. This includes vinyl glue at several dilutions in order to achieve any of the values comprised in any of the ranges given above. Viscosity according to the present invention, and to the units given above, is to be intended as dynamic viscosity, or internal friction coefficient, and is a measure of viscosity of a liquid that depends on the composition and its temperature. For each substance, the dynamic viscosity is given herein as measured at 25°C. At higher temperatures the dynamic viscosity decreases.

[0014] Therefore, according to a further embodiment of the present invention, the dispenser may be used for

dispensing viscous material having a viscosity in a range from 800 to 25000 cP (mPa*s) at 25°C, and preferably between 2000 to 20000 cP (mPa*s) at 25°C, and most preferably between 7000 and 15000 cP (mPa*s) at 25°C, as above, including vinyl glue and oil. This has the advantage that a precision delivery of viscous material at any of the given viscosity may be obtained by using the dispenser according to the present invention, to deliver the viscous material to structural features of items, objects or craft objects, forming precisely shaped structures that may be able to retain their given shape after delivery and ensure uniform coating of the surfaces and features. This allows the material to be evenly spread, if needed and evenly reshaped or delivered in a shape fitting any of the structural features, and allow the material to coat and dry uniformly across the surface is used on.

[0015] According to a further embodiment of the present invention, the outlet opening of the container for viscous materials may be further provided with a dispensing tip. This has the advantage that a specific format of the orderly structured shape, such as a drop or a line, may be obtained, according to the shape of the dispensing tip. A dispensing tip may have any suitable shape that allows a viscous material of a viscosity in a range of viscosities as given above. A preferred shape for a dispensing tip may be a conical or cylindrical shape, but any suitable shape may be used in carrying out the present invention, according to any particular application.

[0016] The linear guide according to the present invention is configured to receive a container for a viscous material wherein the viscous material is therefore contained, which represents said confined space for the storage, or temporary storage of said viscous material, when the container is received at the linear guide, while the dispenser is in operation.

[0017] A container may be of any suitable shape in order to be received at the linear guide, and the container and the linear guide may have matching shapes, form-fitting or force-fitting shapes or be produced in a single piece. A preferred container may have a cylindrical shape, because a shape lacking corners and sharp edges may be better suited for an optimal utilization of the material therein contained. However, any shape of the container satisfying any given criteria based on engineering and cost-effectiveness reasons, and by which a viscous material is efficiently dispensed through the dispenser according to the present invention, may be envisioned.

[0018] The linear guide of the present invention may be intended to accommodate the specific type of container, for example having sliding components, such as means for releasing and recalling the viscous material, which may be movable with respect to the given container, or any other type of container having similar features. In this instance, and according to the given container, the linear guide might hold separate parts of a container which are mutually movable and/or the linear guide may have the sawtooth profile also movable with respect to the fixed parts of the container, or any other combination thereof that can be an easy product of engineering considerations.

[0019] According to the present invention, means for releasing and recalling the viscous material is provided, comprised in the container, and is configured for being connected to the linear guide by the activating mechanism. Said means for releasing and recalling the viscous material may have any suitable shape to reach in the container, while being connected to the linear guide receiving the container for viscous material. The means for releasing and recalling the viscous material may have a cross-section comparable to the cross section of the container, and a cross-sectional surface in contact with the viscous material within the container. The cross-sectional surface of said means according to the present invention may have a suitable shape to match the shape of the container and provide an equal force per unit area across the whole cross-sectional surface. A preferred shape of said means for releasing and recalling the viscous material may have a circular cross-section and a disc as cross-sectional surface to match a cylindrical shape of the container, because a shape lacking corners and sharp edges may be better suited for an optimal utilization of the material therein contained. However, any shape of the means for releasing and recalling the viscous material, from and within the container, satisfying any given criteria based on engineering and cost-effectiveness reasons, and by which a viscous material is efficiently dispensed through the dispenser according to the present invention, may be envisioned.

[0020] In order to provide for the means for releasing and recalling the viscous material of the present invention for effectively releasing or recalling the viscous material through a confined space, such as a container according to the present invention, an actuating device may be provided. The actuating device according to the present invention has a handle, wherein the handle enables the holding of the dispenser with one hand, with the advantage of having the other hand free to hold down or move or turn an object, item or craft object. The actuating device further comprises a linear guide being mechanically connected to the handle. This means, according to the present invention, that the linear guide may be glued to the handle, produced in a single piece with the handle or fastened to the handle using fastening means.

[0021] The actuating device according to the present invention further comprises an activating mechanism forming a form-fit and/or force-fit connection with the linear guide to provide a bidirectional linear motion to the linear guide. Form-fit and force-fit connections are intended according to the present invention in the meaning from the field of mechanics and mechanical engineering. According to the present invention, the form-fit and/or force-fit connection of the activating mechanism with the linear guide enable the activating mechanism to engage with the linear guide, so that the activating mechanism may provide a bidirectional linear motion to the linear guide,

so that the linear guide may move backwards and forwards when the activating mechanism is operated. The previously described configuration according to the present invention, which enables holding of the dispenser by the handle with one hand, may be herein combined with the operating of the activating mechanism of the actuating device similarly using only one hand. The combination of the activating mechanism of the actuating device and of the handle of the actuating device enable therefore the dispenser to be held and operated even while being held with only one hand. For this purpose, the handle and the activating mechanism may be arranged in the same physical region of the dispenser, in such a way that while holding the dispenser with one hand, an operator may reach the activating mechanism and operate it comfortably.

[0022] According to the present invention, a type of container for viscous material that could be used to carry out the present invention may be envisaged as a commercially available syringe, endowed with a piston and a dispensing tip, and capable of holding enough viscous material to carry out any of the carpentry or craft tasks, as mentioned above, with ease, without resulting too heavy to manage for the one-hand use, as suggested above. A typical longitudinal size for such a container may be comparable with the size of a user's hand, while its cross-section may have a diameter comparable with the diameter of a circle described between a first finger and a second finger of a user. An advantage of such container is that it is already commercially available, may be ordered in bulk quantities and may be available relatively inexpensively. However, according to the description given above, any other container that follows the given criteria and possesses suitable features may be used.

[0023] According to a further embodiment of the present invention, the linear motion provided to the linear guide may be a bidirectional linear motion in a forward or backward direction, along a longitudinal symmetry axis of the linear guide, parallel to a longitudinal symmetry axis of the container. This has the advantage that said motion, transmitted from the linear guide to the means for releasing and recalling the viscous material from and within the container, may aid the releasing and recalling of the viscous material through the opening.

[0024] According to a further embodiment of the present invention, the linear guide may have a saw-tooth profile and the activating mechanism may be at least partially a gear wheel forming at least in part a form-fit and/or force-fit connection with the linear guide. Moreover, when the activating mechanism is arranged in the same physical region of the handle, and either built-in the handle, built as a one-piece item with the handle, or arranged within the handle and held with connecting and/or fastening means, the activating mechanism being at least partially a gear wheel provide easier operation of the wheel, as it can be easily reached while holding the dispenser by the handle. Moreover, the form-fit and/or force-fit connection of the gear wheel with the linear guide having a saw-tooth profile may have the advantage of enabling operation of the gear wheel more effectively.

[0025] According to a further embodiment of the present invention, the gear wheel may be configured to move clockwise and anticlockwise. This may enable the linear bidirectional motion of the linear guide, providing a comfortable, ergonomic reach of the mechanism when arranged in the same physical region of the handle, while holding the handle; moreover, in any other case, the gear wheel moving clockwise and anticlockwise may directly influence the bidirectional linear motion of the linear guide, providing a one-hand utilization of the dispenser of the present invention.

[0026] According to a further embodiment of the present invention, the activating mechanism may form a form-fit and/or force-fit connection with the means for releasing and recalling the viscous material, and may be configured to impart a linear motion to said means. This way, the activating mechanism may be used to control directly the delivery and recalling of the viscous material from and within a container, without necessitating the use of another hand or any other aid to do so.

[0027] According to a further embodiment of the present invention, the means for releasing and recalling the viscous material further comprise a fluid-tight sealing element suitable to adhere in a fluid-tight manner to an inner surface of the container. In this manner, the means for releasing and recalling the viscous material may adhere to the walls of the container, so that the viscous material across the whole cross-section of the container may be conveniently pushed through the container, and forced through the opening and the dispensing tip, if present. The fluid-tight sealing element may be made of rubber or a synthetic material, sufficient to enable the adherence of the sealing element to the walls of the container while at rest and while the means for releasing and recalling the viscous material are pushed back and forth through the container, in such way that the sealing element finds itself in contact with the viscous material and is able to sweep the surfaces of the container it is in contact with, in a homogeneous manner across its surface and along its perimeter, providing that no or neglectable residues of viscous material are left behind during the forward push provided by the means for releasing and recalling the viscous material.

[0028] According to a further embodiment of the present invention, a sealing cap is provided, for sealing a dispensing tip of a container for viscous material, suitable for use with the dispenser of any of the previous embodiments. The sealing cap according to this further embodiment has a recess for engaging, preferably in a form-fit connection, with the dispensing tip, and it may provide a fluid-tight sealing. The sealing cap may alternatively be provided with a protrusion suitable for engaging with an opening of a container, similarly in a form-fit connection and may be provided for sealing an opening of a container for viscous material according to the

present invention. A viscous material as described above may reveal sensitivity to environmental conditions. According, for example, to the level of dilution of the viscous material, and therefore to the variable amount of water or other solvents present in the viscous material, high or low humidity level, high or low heat or any rapid variations thereof, such as, for example, changing rooms or operating indoor or outdoor, may play a role in changing the consistency of the viscous material, altering its chemical structure, and degrading its consistency to the point of impairing its effect and causing the affected batch to be unusable for the intended purpose. Other causes of degradation by contact of the viscous material with air and unpredictable environmental conditions such as moisture and heat, may include oxidation, changes in viscosity, etc. Providing fluid-tight, and in particular air-tight sealing to a container in use may reflect positively on the continuity of work and prevent the degradation of the viscous material, consistently saving from loss of degraded product. The sealing cap has a recess for engaging, preferably in a form-fit connection, with the dispensing tip, so that the environment in the immediate premises of the tip, and therefore of the viscous material of a container provided with a dispensing tip, is prevented from having contact with a pocket of air or moisture. Similarly and to the same end, the sealing cap may have a protrusion for engaging preferably in a form-fit connection with an opening of a container.

[0029] Moreover, according to a further embodiment of the present invention, the sealing cap has preferably a single stable resting position, and wherein the single stable resting position is obtained with respect to a surface opposite to the recess. The sealing cap of the present invention has therefore the advantage that it can be easily removed and thrown on a surface, ensuring that it will always find a stable position where to rest, before being used again to seal in the viscous material in a container for viscous material used with the dispenser of the present invention. His allows work to be continuously carried out, without worrying that the sealing cap may roll of slide away, reducing waste of time between operating the dispenser for viscous materials or allowing quick and seamless exchange of containers. The sealing cap according to the present invention is therefore monostatic, or self-righting, which means that it has preferably a single resting position of stable equilibrium; in particular this position is obtained with respect to a surface of the sealing cap opposite to the recess or protrusion. >From an engineering point of view, achieving a monostatic sealing cap according to the present invention may be achieved in any of the following ways: by varying the density of the material of which the sealing cap is made, so that the density of the sealing cap is not homogeneous; by shaping the sealing cap in a way that, according to geometrical considerations, achieves a three-dimensional homogeneous convex object which, by construction, is then able to return to its unique position of rest, regardless of its initial position on a surface. If varying the density of the material to obtain a monostatic object, the center of mass of the object is pushed lower than its geometrical centre of symmetry, preferably located in the bottom half of the object. A lower center of mass may bias the object to assume its single resting position with respect to a surface that therefore becomes its bottom surface. Because the surface is opposite the recess or the protrusion that engages with a feature of a container for viscous material, this also has the advantage that any residues of viscous material to be found around said recess or protrusion are not transferred to the surface where the sealing cap is put at rest. Preferred materials may be resins, plexiglass, metal and non-metal alloys, or most preferably wood, or any combination thereof.

[0030] According to a further embodiment of the present invention, the inner surface of the recess or the outer surface of the protrusion of the sealing cap according to the present invention is formed or at least lined with a same material of the dispensing tip or of the opening of a container. This has the advantage that the contact between materials of the same composition increases the contact points between the features of the container and the sealing cap, allowing for better sealing efficiency. This in turns may ensure a better preservation of the air-tight environment in the immediate premises of the viscous material, and the preservation of its chemical integrity.

[0031] According to a further embodiment of the present invention, a refilling station for refilling a container suitable for use with the dispenser of the present invention is provided. The refilling station comprises a tank for containing viscous materials and an outlet opening. This provides for a fast refilling of a container for viscous material suitable for use with the dispenser of the present invention, enabling that several ready-to-use containers may be quick exchanged within a dispenser according to the present invention, or enabling refilling of any container suitable for use in the dispenser according to the present invention.

[0032] According to a further embodiment of the present invention, the outlet opening of the refilling station may be configured to form a form-fit connection with a dispensing tip of the container suitable for use with the dispenser of the present invention, the container comprising means for releasing and recalling the viscous material from the container, and wherein the outlet opening is provided with a membrane, preferably a self-sealing air-tight membrane. This has the advantage that a dispensing tip or an opening of a container as described above may be inserted at the outlet opening with the membrane, preferably self-sealing and air-tight, so that a refill of viscous material may be delivered directly within the container while in use in the dispenser or when removed from the dispenser, to avoid wasting time and material, and reduce chances of contamination of the material by preventing its exposure to air during the refilling operation.

[0033] Moreover, the tank of the refilling station may

be made of collapsible, soft, pliable and/or flexible material: this may help ensuring that little or no residual air is left behind in the tank while the refilling station is being depleted of viscous material by providing refills of viscous material to a container according to the present invention. This in turn may prevent degradation of the viscous material such as for example by causing it to dry or degrade by exposing the viscous material to air, moisture, heat or oxidation agents, or any combination thereof. The tank may be also manually squeezed to release viscous material, and it may additionally contain a valve to release any residual air, wherein the valve may be located on a top surface of the tank, and preferably on an opposite side to the opening. A valve may additionally or alternatively be arranged in proximity to the opening. The opening may alternatively be provided with a nozzle or dispensing tip, to refill a container comprising an opening according to the present invention.

[0034] According to a further embodiment of the present invention, the refilling station is configured to be mounted or removably mounted to a wall, on a table or on a support; for example a standing support. This has the advantage that refilling may be carried out in a hurry, if needed, or planned ahead as usual, to cater for different practical refilling necessities. The refilling station may be therefore adapted to be mounted on any walls or surface where its positioning may reveal convenient for the type of application and user's business wherein said viscous materials are used. A preferred application of the refilling station according to the present invention may refer to a situation wherein a single operator may be able to carry out the entire refilling operation, even in a hurry, and by using with only one hand, while the other hand may be used to perform other actions, such as, for example, holding an item or craft object.

[0035] According to a further embodiment of the present invention, an actuating device for actuating means for releasing and recalling viscous material from and to a container for viscous material, the actuating device comprising: a handle; a linear guide mechanically connected to the handle, and configured to receive a container for viscous material; an activating mechanism forming a form-fit and/or force-fit connection with the linear guide, and configured to impart a bidirectional linear motion to the linear guide. The actuating device has the advantage that it may be used with one hand. By holding the actuating device by the handle and operating the activating mechanism, the linear guide maybe moved back and forth, transmitting a bidirectional linear motion to a means for releasing and recalling viscous material from and to a container for viscous material.

[0036] According to a further embodiment of the present invention, the actuating device of the previous embodiment when applied to actuate a dispenser apparatus, such as the one of the present invention, may enable controlling the delivery or recalling of viscous material from a suitable container by the transmission of a bidirectional linear motion to a means for releasing and recalling viscous material from and to a container for viscous material.

[0037] By way of example only, figures 1-3 are provided to illustrate some embodiments of the present invention and suggest ways to carry it out. The exemplary embodiments represent a suggestion on how the invention may be carried out but are not intended to limit it in any way.

[0038] Any of the figures herein provided is not and cannot be intended as a blueprint indication of how to accurately engineer the invention. The drawing therein provided have a purely illustrative function, as to show how a finite product may look like but are not intended to show precise structural relationships that may occur between components.

Figure 1: Illustration of a partial cross-sectional view of a dispenser according to embodiments of the present invention.

Figure 2: Illustration of a cross-sectional view and a bottom view of a sealing cap according to embodiments of the present invention.

Figure 3: Illustration of a partial cross-sectional view of an actuating device according to embodiments of the present invention.

[0039] Fig. 1 shows an illustration of a cross-sectional view of a precision dispenser 100 for a viscous material 101 according to embodiments of the present invention, comprising an actuating device having a handle 110, a linear guide 120 for receiving a container 130 for viscous material 101, the linear guide 120 being mechanically connected to the handle 110, and an activating mechanism 160, wherein the container 130 comprises an outlet opening 140 and means for releasing and recalling 150 the viscous material 101 from the container 130, and wherein the means for releasing and recalling 150 the viscous material 101 are configured for being connected to the linear guide 120 by the activating mechanism 160, wherein the activating mechanism 160 forms a form-fit and/or force-fit connection with the linear guide to provide a bidirectional linear motion to the linear guide 120. Fig. 1 additionally shows a fluid-tight sealing element 180, according to embodiments of the present invention, which is comprised in the means for releasing and recalling 150 the viscous material 101. The fluid-tight sealing element 180 is in contact with walls of the container 130 to ensure that none or minimal residue of viscous material 101 may be left over when the means 150 are pushed through the container and having a surface in contact with the viscous material 101 across its extension. Fig. 1 also shows a symmetry axis 170 of the container 130, representing a parallel straight line to a straight line along which the linear guide 120 may be operated, resulting in a bidirectional linear motion of the linear guide 120. The double arrow on the linear guide 120 represents the two

different and opposite orientations in which the linear guide 120 may be operated. The activating mechanism 160 is represented as a gear wheel and also features h a double curved arrow, indicating the clockwise and anticlockwise directions of movement in which the activating mechanism 160 may be operated. Fig. 1 shows the activating mechanism 160 arranged in the same physical region of the handle 110, so that the activating mechanism 160 may be operated while holding the dispenser 100 by the handle 110 with one hand. The activating device 160 is a gear wheel. The exemplary arrangement of Figure 1 does not show but implicitly includes engineering solutions, such as further components, parts or portions of a housing, for fixing the container (130) while the means for releasing and recalling 150 (e.g. a piston of the container) the viscous material 101 may move with the linear guide. Components or parts or portions of the linear guide may include the sawtooth profile movable with respect to the housing and parts of the container. Further components of the housing may be connected to the handle for stability reasons.

[0040] It is in the meaning of the present invention to implicitly include mechanically sound solutions for connecting mutually movable parts, but not to explicitly limit it to any of those solutions specifically.

[0041] The upper part of Fig. 2 shows an illustration of a cross-sectional view of a sealing cap 200 according to the present invention and a symmetry axis 170 of the sealing cap 200. The sealing cap 200 is provided for sealing a dispensing tip 190 of a container 130 for viscous material 101, suitable for use with the dispenser 100 of Fig. 1 and of any of the embodiments described above. The sealing cap 200 has a recess 210 for engaging, preferably in a form-fit connection, with the dispensing tip, and it may provide an air-tight sealing. The lower part of Fig. 2 shows a bottom view of a sealing cap 200 according to the present invention, wherein a way to achieve the sealing cap being monostatic is represented by having a different material 220 of higher density in the bottom half of the sealing cap. The sealing cap 200 is represented as a sphere, as this shape may provide a good and ergonomic grip to an operator, but other shapes are possible, such as egg-shape or a gömböc-like shape, etc., modified to introduce the recess 210, and any shape that supports the sealing cap 200 being monostatic .

[0042] Fig. 3 shows an illustration of a cross-sectional view of an actuating device 300 for actuating means for releasing and recalling 150 viscous material 101 from and to a container 130 for viscous material 101 according to the present invention, the actuating device 300 comprises a handle 110; a linear guide 120 mechanically connected to the handle 110, and configured to receive a container 130 for viscous material 101; an activating mechanism forming a form-fit and/or force-fit connection with the linear guide, and configured to impart a bidirectional linear motion to the linear guide. The actuating device 300 has the advantage that it may be used with one hand. By holding the actuating device 300 by the handle 110 and operating the activating mechanism 160, the linear guide 120 maybe moved back and forth, transmitting a bidirectional linear motion to a means for releasing and recalling 150 viscous material 110 from and to a container 130 for viscous material 101. The activating mechanism 160 is represented as a gear wheel arranged in the same physical region of the handle 110 as this may more easily enable operating the gear wheel while holding the handle 110 of the actuating device 300 with one hand.

[0043] Similarly, as in Fig. 1, the exemplary arrangement of Figure 3 does not show but implicitly includes engineering solutions, such as further components, parts or portions of a housing, for fixing the container (130) while the means for releasing and recalling 150 (e.g. a piston of the container) the viscous material 101 may move with the linear guide. Components or parts or portions of the linear guide may include the sawtooth profile movable with respect to the housing and parts of the container. Further components of the housing may be connected to the handle for stability reasons.

[0044] It is in the meaning of the present invention to implicitly include mechanically sound solutions for connecting mutually movable parts, but not to explicitly limit it to any of those solutions specifically.

Claims

1. A precision dispenser (100) for a viscous material (101), comprising:

an actuating device (300), having

a handle (110)
a linear guide (120) for receiving a container (130) for viscous material (101), the linear guide (120) being mechanically connected to the handle (110), and
an activating mechanism (160),

wherein the container (130) comprises an outlet opening (140) and means for releasing and recalling (150) the viscous material (101) from the container (130), and wherein the means for releasing and recalling (150) the viscous material (101) are configured for being connected to the linear guide (120) by the activating mechanism (160), wherein the activating mechanism (160) forms a form-fit and/or force-fit connection with the linear guide (120) to provide a bidirectional linear motion to the linear guide (120).

2. The dispenser (100) of claim 1, wherein the linear motion is a bidirectional linear motion in a forward or backward direction, along a longitudinal symmetry axis of the linear guide (120), parallel to a longitudinal symmetry axis (170) of the container (130).

3. The dispenser (100) of claims 1 or 2, wherein the linear guide (120) has a saw-tooth profile and the activating mechanism (160) is at least partially a gear wheel forming at least in part a form-fit and/or force-fit connection with the linear guide.

4. The dispenser (100) of claim 3, wherein the gear wheel is configured to move clockwise and anticlockwise.

5. The dispenser (100) of any of claims 1 to 4, wherein the activating mechanism (160) forms a form-fit and/or force-fit connection with the means for releasing and recalling (150) the viscous material (101), and is configured to impart a linear motion to said means (150).

6. The dispenser (100) of any of claims 1 to 5, wherein the outlet opening (140) is further provided with a dispensing tip (190).

7. The dispenser (100) of any of claims 1 to 6, wherein the means for releasing and recalling (150) the viscous material (101) further comprise a fluid-tight sealing element (180) suitable to adhere in a fluid-tight manner to an inner surface of the container (130).

8. The dispenser (100) of any of claims 1 to 7, wherein the viscous material (101) has a viscosity in a range from 800 to 25000 cP (mPa*s) at 25°C, and preferably between 2000 to 20000 cP (mPa*s) at 25°C, and most preferably between 7000 and 15000 cP (mPa*s) at 25°C.

9. A sealing cap (200), suitable for use with the dispenser (100) of any of claims 1 to 8, for sealing a dispensing tip (190) or an opening (140) of a container (130) for viscous material (101), wherein the sealing cap has a recess (210) or a protrusion for engaging, respectively, with the dispensing tip (190) or the opening (140), preferably in a form-fit connection, and wherein the sealing is a fluid-tight sealing.

10. The sealing cap (200) according to claim 9, wherein the sealing cap has preferably a single stable resting position, and wherein the single stable resting position is obtained with respect to a surface opposite to the recess (210).

11. The sealing cap (200) according to claims 9 or 10, wherein an inner surface of the recess (210) or an outer surface of the protrusion are lined with a same material of the dispensing tip (190) or of the opening (140).

12. A refilling station for refilling a container (130) suitable for use with the dispenser (100) of claim 1, comprising a tank for containing viscous materials (101) and an outlet opening.

13. The refilling station according to claim 12, wherein the outlet opening is configured to form a form-fit connection with a dispensing tip (190) of the container (130), the container (130) comprising means for releasing and recalling (150) the viscous material (101) from the container (130), and wherein the outlet opening is provided with a membrane, preferably a self-sealing air-tight membrane.

14. The refilling station according to claims 12 or 13, wherein the station is configured to be mounted or removably mounted to a wall, on a table or on a support.

15. Actuating device (300) for actuating means for releasing and recalling (150) viscous material (101) from and to a container (130) for viscous material (101), the actuating device (300) comprising: a handle (110); a linear guide (120) mechanically connected to the handle (110), and configured to receive a container (130) for viscous material (101); an activating mechanism (160) forming a form-fit and/or force-fit connection with the linear guide (120), and configured to impart a bidirectional linear motion to the linear guide (120).

16. Actuating device (300) according to claim 15, for use in the dispenser (100) according to one of the claims 1 to 8.

17. Use of the precision dispenser (100) of any of claims 1 to 8, for dispensing viscous materials (101) from a group of viscous materials (101) having a viscosity in a range from 800 to 25000 cP (mPa*s) at 25°C, and preferably between 2000 to 20000 cP (mPa*s) at 25°C, and most preferably between 7000 and 15000 cP (mPa*s) at 25°C, including vinyl glue and oil.

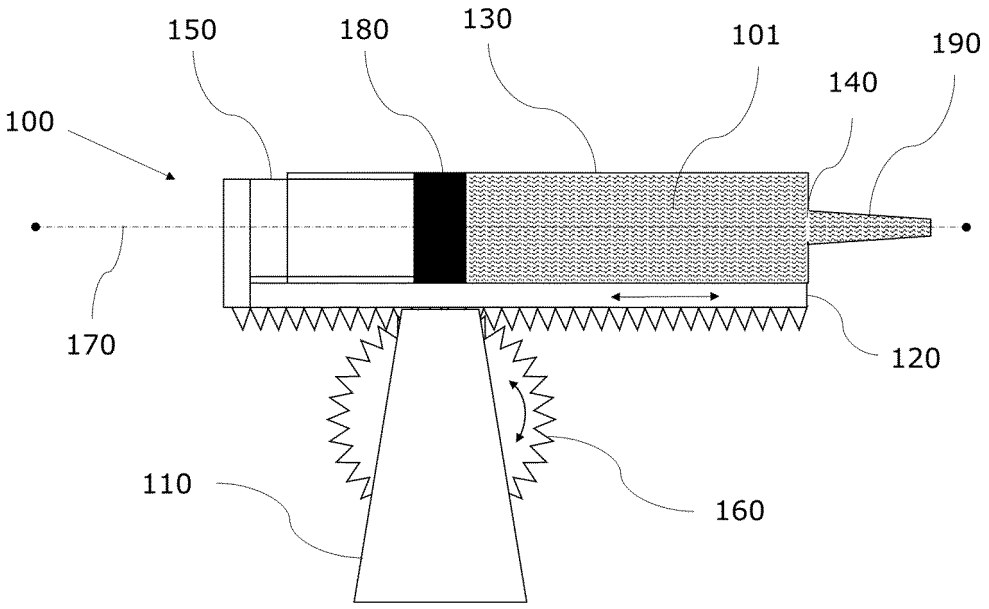

Fig. 1

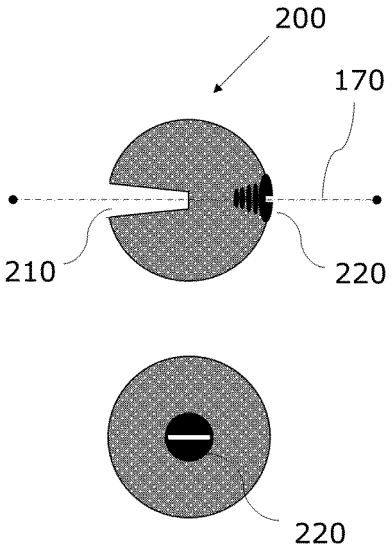

Fig. 2

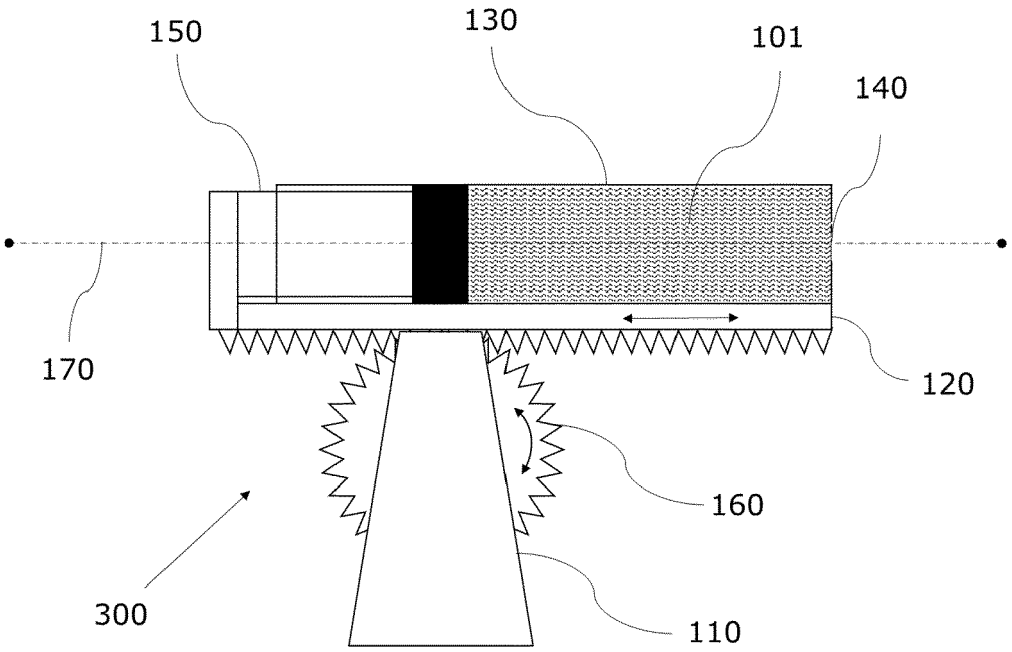

Fig. 3