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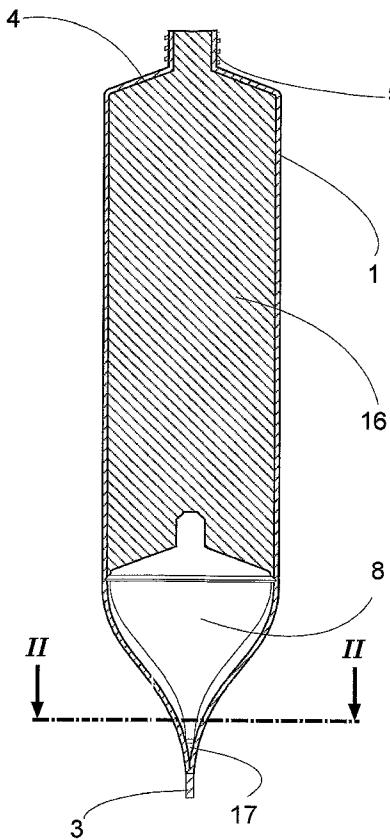
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(54) Title: TUBE DISPENSING DEVICE



(57) Abstract: This invention provides a deformable dispensing tube (1) with an internal device (8). The device is contained within the deformable dispensing tube but is a separate physical entity to the deformable dispensing tube and has the ability to move within the deformable dispensing tube. The object of the device is to aid the dispensing of part or all of the contents (16) of the deformable dispensing tube by the user.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AMENDED CLAIMS

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CLAIMS

1. An internal device for inclusion in a deformable dispensing tube that is initially set at the sealed end of the deformable dispensing tube and works as a flexible internal piston to aid dispensing of the contents by the user, comprising of the internal device as a self contained separate physical entity to the deformable dispensing tube whereby the internal device is capable of moving lengthwise within the deformable dispensing tube, the internal device further comprising a device body with flexible or deformable outer walls and a hollow centre that contains a material or fluid material which assists to support the flexible outer walls at the device's designed or designated shape and which, when in use within the deformable dispensing tube and when the deformable dispensing tube is not exposed to any external forces or pressure, the material or fluid material within the hollow centre of the internal device assists the flexible outer walls of the device body with both the capability and the force or pressure required to ensure that the cross sectional shape of the deformable dispensing tube and the cross sectional shape of the internal device conform to each other in such a manner that a consistent and effective seal is created between the internal device and the deformable dispensing tube and in which, when in use within the deformable dispensing tube, the material or fluid material within the hollow centre of the internal device reacts to any external forces or pressure applied to the deformable dispensing tube by the user or by any other means with a corresponding change in the internal device's own self-contained force or pressure such that the flexible walls of the device body are forced against the internal surfaces of the deformable tube ensuring that the flexible walls of the internal device deform in keeping with any deformation of the internal surfaces of the deformable tube thereby maintaining and enhancing the consistent and effective seal between the internal device and the deformable tube.
2. An internal device for inclusion in a deformable dispensing tube that is initially set at the sealed end of the deformable dispensing tube and works as a flexible internal piston to aid dispensing of the contents by the user, comprising of the internal device as a self contained separate physical entity to the deformable dispensing tube whereby the internal device is capable of moving lengthwise within the deformable dispensing tube, the internal device further comprising of a device body with flexible or deformable outer walls, a flexible or deformable device top and a hollow centre that contains a material or fluid material which assists to support the flexible outer walls and the flexible device top at the device's designed or designated shape and which, when in use within the deformable dispensing tube, the material or fluid material within the hollow centre combined with the flexible outer walls and flexible top of the internal device has the ability to react to any external forces or pressure applied to the deformable dispensing tube by the user or by any other means with a corresponding

deformation of the device top in an axial direction towards the contents of the deformable dispensing tube thereby expelling part of the contents of the deformable dispensing tube and whereby when said external pressure or manipulation is removed the device returns to its original un-deformed state.

3. A deformable tube for dispensing liquid substances with an Internal device as in Claim 1 or Claim 2, where the Internal device forms an effective and consistent seal between the end of the device facing the formed opening and the Inside surface or surfaces of the deformable dispensing tube thereby preventing any transgression by the contents so that the contents remain between the device and the formed opening of the deformable tube, even under reasonable pressure and when the deformable dispensing tube is full or empty or at any stage between.
4. A deformable tube for dispensing liquid substances with an Internal device as in Claim 1 or Claim 2, that when the device is Inside the deformable dispensing tube the three dimensional shape of the device is such that it provides the stability needed to maintain a consistent seal between the end of the device facing the formed opening and the deformable tube thereby preventing any transgression by the contents so that the contents remain between the device and the formed opening of the deformable tube, even under reasonable pressure and when the deformable dispensing tube is full or empty or at any stage between.
5. A deformable tube for dispensing liquid substances with an Internal device as in Claim 1 or Claim 2, where the three dimensional form and physical or material nature of the Internal device and its behavioural properties when within the deformable dispensing tube provides the ability of the device to maintain a consistent seal within a deformable dispensing tube and allows the device to act as an Internal piston that can effectively dispense the contents from a deformable dispensing tube.
6. A deformable tube for dispensing liquid substances with an Internal device as in Claim 1 or Claim 2, where the cross section of the Internal device where it creates a consistent seal with the deformable dispensing tube matches in shape and size or is able to match in shape or size the internal cross section of the deformable tube at the end near the formed opening so that device not only maintains a consistent seal throughout the movement of the device within the deformable dispensing tube but also maximises the capacity of the Internal volume.
7. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where part of the Internal device is designed as a flexible seal in such a manner that any Increase in pressure of the contents against the seal results in a corresponding Increase in the sealing force and thereby provide a consistent seal even under reasonable pressure.
8. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the shape and material nature of the Internal device is such that at the point of

sell ing the deformable dispensing tube is forced to adapt to the shape of the internal device thereby providing a consistent seal between the internal device and the deformable tube throughout the movement of the device within the deformable dispensing tube.

9. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the shape and material nature of the device is such that the shape of the device is able to deform in keeping with any deformation caused to the deformable dispensing tube and thereby maintaining a consistent seal between the internal device and the deformable tube.
10. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the shape and material nature of both the internal device and the deformable dispensing tube when combined is such that a consistent seal is both created and maintained between the device and the deformable tube under any deformation or pressure.
11. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the internal device is made of a material or materials that not only maintain the consistent seal within the deformable dispensing tube but also enable easy movement of the device within the deformable dispensing tube in the direction of the formed opening of the deformable dispensing tube.
12. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the internal device will be shaped or will have features such that it will only physically move in the direction towards the formed opening and not in the direction towards the sealed end of the deformable dispensing tube.
13. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the three dimensional form of the internal device nearest the formed opening of the deformable tube matches or has the ability to match the interior three dimensional form of the formed opening in a male to female manner such that the internal device can enter the formed opening and thereby expel as much of the contents as is feasibly possible.
14. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the cross section of the internal device changes or tapers along its length from the device top towards the device tail in such a manner that allows or encourages the deformable dispensing tube to collapse or be deformed behind the device such that the then empty or near empty part of the deformable dispensing tube can deform to a flat or near flat state.
15. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the cross section of the internal device nearest the sealed end of the deformable tube matches in shape and size the internal cross section at or near the sealed

end of the deformable tube in order to minimise the length of the device end or the overall length of the deformable dispensing tube.

16. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the cross section of the deformable dispensing tube is ideally round at the end where the formed opening is created, although this cross section may also be oval, elliptical, or any polygon shape with or without radius-ed corners or edges.
17. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where an internal pressure may also be created directly or indirectly by the user or by any remote means or by gravity.
18. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where any internal pressure created will bear against the internal surfaces of the deformable dispensing tube, thereby forcing the internal volume of the deformable dispensing tube to its greatest capacity.
19. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the internal device is designed to be effectively rigid and when an external pressure is applied by the user to the deformable dispensing tube at or near the location of the internal device, there is no significant flexure or deformation of the device.
20. A deformable tube for dispensing liquid substances with an internal device as in Claim 2, where the internal device is designed to flex such that when an external pressure is applied by the user to the deformable dispensing tube at or near the location of the internal device, the internal device is able to flex or deform in the direction of the formed opening of the deformable dispensing tube thereby expelling part of the contents without the internal device actually moving within the deformable tube before returning to its original un-flexed or un-deformed state when the external pressure is released.
21. A deformable tube for dispensing liquid substances with a flexible internal device as in Claim 20, where the internal device is able to advance towards the formed opening once the flexible internal device has reached its limit of flexure when an external pressure is applied by the user to the deformable dispensing tube at or near the location of the internal device thereby expelling part or all of the contents of the deformable tube,
22. A deformable tube for dispensing liquid substances with a flexible internal device as in Claim 20, where having already been deformed by an external pressure applied by the user the flexible internal device then returns back to its original un-flexed or un-deformed state when the external force is removed and the flexible internal device then advances itself in the direction of the formed opening.

23. A deformable tube for dispensing liquid substances with a flexible internal device as in Claim 20, where having already been deformed by an external pressure applied by the user the flexible internal device then returns back to its original un-fixed or un-deformed state when the external force is removed and the flexible internal device then retracts the remaining contents back into the deformable dispensing tube leaving the formed opening clean and free from any of the contents.
24. A deformable tube for dispensing liquid substances with a flexible internal device as in Claim 20, where having already been deformed by an external pressure applied by the user the flexible internal device then returns back to its original un-fixed or un-deformed state when the external force is removed and the flexible internal device then both advances itself in the direction of the formed opening and retracts the remaining contents back into the deformable dispensing tube leaving the formed opening clean and free from any of the contents.
26. A deformable tube for dispensing liquid substances with an internal device as in Claim 20, such that when the external pressure is applied by the user to the deformable dispensing tube at or near the location of the internal device the amount of flexure or deformation that occurs to the internal device can be dictated by the design and material specification of the device such that the flow of the contents and the movement of the device within the deformable tube can be tailored for differing specifications or contents.
26. A deformable tube for dispensing liquid substances with an internal device as in Claim 20, where on production assembly the internal device can be deformed or extended prior to insertion into the tube such that the extended device can be inserted into the as yet un-sealed end of the deformable tube and up against the contents and when the device is allowed to return to its un-deformed or extended state it draws itself into the deformable tube and forming a consistent seal.
27. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the combination of the internal device being able to move within the deformable dispensing tube combined with the non-return feature or features of the device preventing the device from moving back in the direction of the sealed end allows for the contents of the deformable tube to always be presented correctly at the formed opening for easy and immediate dispensing even when the deformable dispensing tube is part or near empty.
28. A deformable tube for dispensing liquid substances with an internal device as in Claim 1 or Claim 2, where the internal device has a non-return feature or features that prevent the device from moving back in the direction of the sealed end and so provides the advantage of the contents still being dispensed even when the user applies the external force in the area between the device top and the formed opening.

STATEMENT UNDER ARTICLE 19 (1)

The following claims are filed in accordance with article 19 amendments.

The amendments to claims **one** and **two** have further clarified the new and novel elements of the device as characterized and depicted in the description and the specific embodiments.

All other claims 3 to 28 remain unchanged,