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Applicant: Knight, David
59 Antrim Road
Woodley nr. Reading Berkshire(GB)

Inventor: Knight, David
59 Antrim Road
Woodley nr. Reading Berkshire(GB)

Representative: Brereton, Paul Arthur et al,
REDDIE & GROSE 16 Theobalds Road
London WC1X 8PL(GB)

A tube-squeezing dispenser.

A dispenser for use in dispensing a viscous substance such as toothpaste from a manually-compressible tube 10 with an outlet nozzle 20 comprises a support 11 which holds the tube 10 in a vertical position. A frame 15 can slide vertically inside the support and carries two parallel rollers 13 and 14 which engage opposite sides of the tube 10. One of the rollers 13 carries a lever 18 which projects from the casing and can be pressed by the user to rotate the roller 13 about its pivot axis 16. The pivot axis is eccentric so that movement of the lever in the direction A causes the roller 13 to move towards the roller 14 thus nipping the tube 10. Subsequent movement of the lever causes the second roller 14 also to rotate so that the area of contact between the rollers and tube moves along the tube towards the nozzle 20 squeezing material from the tube.

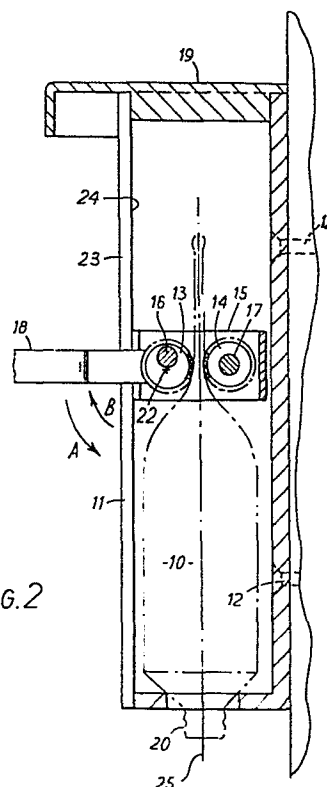


FIG. 2

A TUBE-SQUEEZING DISPENSER

The invention relates to dispensers for viscous substances, such as toothpaste, supplied in manually compressible tubes.

Various types of tube-squeezing dispensers are known. In one form the tube is placed between two pivoted plates which can be swung together and pressed by the action of a lever-operated cam. Such a dispenser is shown in U.K. Patent Specification No. 694654. In such devices it is difficult to control the amount of material dispensed because the whole of the tube is squeezed at the same time.

Another kind of dispenser comprises two rollers carried by a frame. The tube is inserted between the rollers and the rollers are moved along the tube squeezing the tube between them. In one form of this dispenser such as is shown in U.K. Patent Specifications Nos. 1000241 and 602639 the rollers are pulled along the tube by a ratchet and pawl mechanism but this has the disadvantage that a considerable force is necessary to drag the rollers along the tube with the result that it is necessary to anchor the tube at its closed end and to make the construction sufficiently robust to withstand these forces. In another form such as is shown in U.K. Patent No. 1044036 and 1338619 one of the rollers is turned by an operating lever to cause the tube to be fed between the rollers. Such a device requires a continuous turning action and is not conveniently adapted for a wall mounted dispenser which dispenses a controlled quantity of material at each operation.

Finally U.S. Specification No. 3974943 shows a tube-squeezing dispenser in which a wedge shaped pressure member is disposed in a

housing which holds the tube vertically and has a handle which can be pressed to rock the wedge so that it presses the tube against the wall of the housing. The pressure member has a rounded undersurface which facilitates the rocking movement on the tube which causes the
5 tube to be squeezed. This dispenser has the disadvantage that it tends to pull the tube down the housing so that the tube becomes crumpled and the wedge cannot slide freely down between the wall of the housing and the flattened part of the tube.

The object of the present invention is to provide a tube
10 squeezing dispenser which is simple and inexpensive in construction and does not suffer from the disadvantages of the known devices mentioned above.

According to the invention, there is provided a dispenser for use in dispensing a viscous substance from a manually compressible
15 tube with an outlet nozzle, the dispenser comprising a support for the tube and frame which is movable relative to, and guided by the support for movement along the tube and which carries first and second squeezing members for engaging opposite sides of the tube, the first squeezing member being pivoted on the frame and being
20 coupled to a lever, operable by the user whereby the user can rotate the first squeezing member about its pivot axis, and the second squeezing member also being pivoted on the frame; the surface of the first squeezing member being so disposed relative to its pivot axis that rotation of the first member in a first direction causes it
25 initially to move towards the second squeezing member to nip and to press the tube against the second squeezing member so that subsequently the second squeezing member is caused to rotate whereby the first and second squeezing member roll on the surfaces of the tube so that the

areas of contact between the first and second squeezing members and the tube move along the tube towards the nozzle, rotation of the first member in a direction opposite to the first direction causing the first squeezing member to move away from the second squeezing member, 5 allowing the frame to move along the tube towards the nozzle.

Preferably, the first member is a cylindrical roller mounted for rotation about an axis parallel to and spaced from its central longitudinal axis.

10 Preferably the second member is also a roller mounted for rotation about its central longitudinal axis. With such an arrangement it is advantageous so to position the pivot axes that the central longitudinal axes of the rollers lie in a plane which is substantially perpendicular to the longitudinal axis of the tube when the rollers are nipping the tube. With such an arrangement the tube is not bent 15 during the nipping operation.

At least one of the members may be knurled or provided with similar means for gripping the tube in order to prevent the tube slipping away from the members during the nipping operation. In the embodiment of the invention having two rollers, the first member 20 being an eccentric roller, it is preferable for the eccentric roller to be provided with the gripping means. The eccentric roller should pivot in such a sense as to tend to advance the frame supporting the rollers along the tube towards the nozzle as a result of the gripping engagement of the tube by the roller.

25 Preferably there is provided a casing to support the frame and the tube, the frame being slidable within the casing. The casing may be attached to, for example, a wall to facilitate one-handed operation of the dispenser.

In embodiments of the invention having a casing as described above, the casing may include a cover for the nozzle of the tube to replace the usual cap, usually of the screw-on type, which is supplied with the tube.

5 The invention will be further described by way of example and with reference to the accompanying drawings, in which:-

Fig. 1 is a view, partly ghosted, of one embodiment of the invention for dispensing toothpaste;

Fig. 2 is a vertical section through the dispenser shown in
10 Fig. 1; and

Fig. 3 is a plan view, with parts cut away, of the dispenser shown in Fig. 1.

Referring to the drawings a tube of toothpaste 10 is mounted vertically in a support or casing 11, with its closed end of the tube
15 10 uppermost and its nozzle 20 lowermost. The casing 11 is attached to a wall by means of screws 12. Two tube squeezing members in the form of rollers 13 and 14, circular in cross-section, are mounted between the sides of a frame 15 which is slidable within the casing 11 and guided by the internal surface 24 of the casing. The rollers 13
20 and 14 have pivots 16 and 17 respectively, the roller 13 being an eccentric roller with its pivot axis 16 offset from its longitudinal axis 22. The roller 14 pivots about its longitudinal axis. In use the rollers 13 and 14 engage opposite sides of the tube 10. A lever 18 extends radially from the roller 13 and projects through a vertical
25 slot 23 in the casing 11 so that it can be gripped by the user and moved up or down to rotate the roller 13 about its pivot.

In preparing the dispenser for use the closed end of the tube 10 is placed between the rollers 13 and 14 and the tube, together

with the frame 15, is then, after removal of a lid 19, placed in the casing 11 nozzle downwards.

To dispense toothpaste from the tube 10, the eccentric roller 13 is pivoted by pressing down on the lever 18 to rotate in the direction of the arrow A. The surfaces of the rollers 13 and 14 are knurled for gripping the surface of the tube 10. The longitudinal axis of the roller 13 is offset from the pivot axis 16 and the level 18 is positioned so that when the lever is substantially horizontal the axis of the roller lies below the pivot axis. Consequently when the lever is pressed downwardly in the direction A the surface 21 of the roller moves towards the second roller 14 nipping the tube and pressing it against the roller 14. The rollers grip the surface of the tube and both rollers roll on the surface of the tube so that the areas of contact between the tube move downwards along the tube towards its nozzle 20 causing toothpaste to be extruded from the nozzle. In practice the pressure on the lever 18 will cause the frame 15 to tilt so that it becomes temporary jammed against the casing and cannot slide relative to it, with the result that the rolling action of the rollers on the tube causes the tube to be raised upwards by a small amount as the rollers 13 and 14 and the frame 15 move downwards relative to the tube 10. When the downwards stroke of the lever 18 is complete the lever 18 is raised i.e. moved in the direction of the arrow B. During raising of the lever 18 the eccentric roller 13 pivots away from the roller 14 and the tube 10. The frame 15 tilts back to its normal condition so that it can slide down the casing and further down the tube under gravity. Now, with another portion of the tube 10 between the rollers 13 and 14, more toothpaste may be extruded from the nozzle of the tube by depressing the lever 18 again.

Thus, by successively depressing and raising the lever 18, the frame 15 moves from the closed end of the tube 10 towards the nozzle 20, progressively extruding toothpaste from the tube. Each time the lever is operated a controlled quantity of toothpaste is dispensed.

5 A cover for the nozzle 20 of the tube may be mounted on the casing 11 to prevent the toothpaste becoming hard or dripping from the tube when the dispenser is not in use. An example of such a cover is a sphere, or part of a spherical surface, arranged to engage the end of the nozzle of the tube. The sphere could be mounted to
10 pivot away from, and to one side of, the nozzle to allow access to the nozzle. A spring could be used to support the sphere in both the closed and open positions. An alternative example of a cover consists of a nozzle mounted on the casing and into which the nozzle of the toothpaste tube fits snugly. A membrane of a rubber or plastics
15 material is fixed over the end of the nozzle and divided into petal-like portions by, for example, 3 cross-cuts. During nipping of the toothpaste tube the toothpaste being extruded from the nozzle of the tube forces the petals of the membrane apart. When the tube is not being nipped the elasticity of the material of the membrane results
20 in the petals closing to their original positions thus sealing the nozzle.

 Although an embodiment of the invention has been shown and described in which the first and second members are rollers, it will be appreciated that they can take other forms.

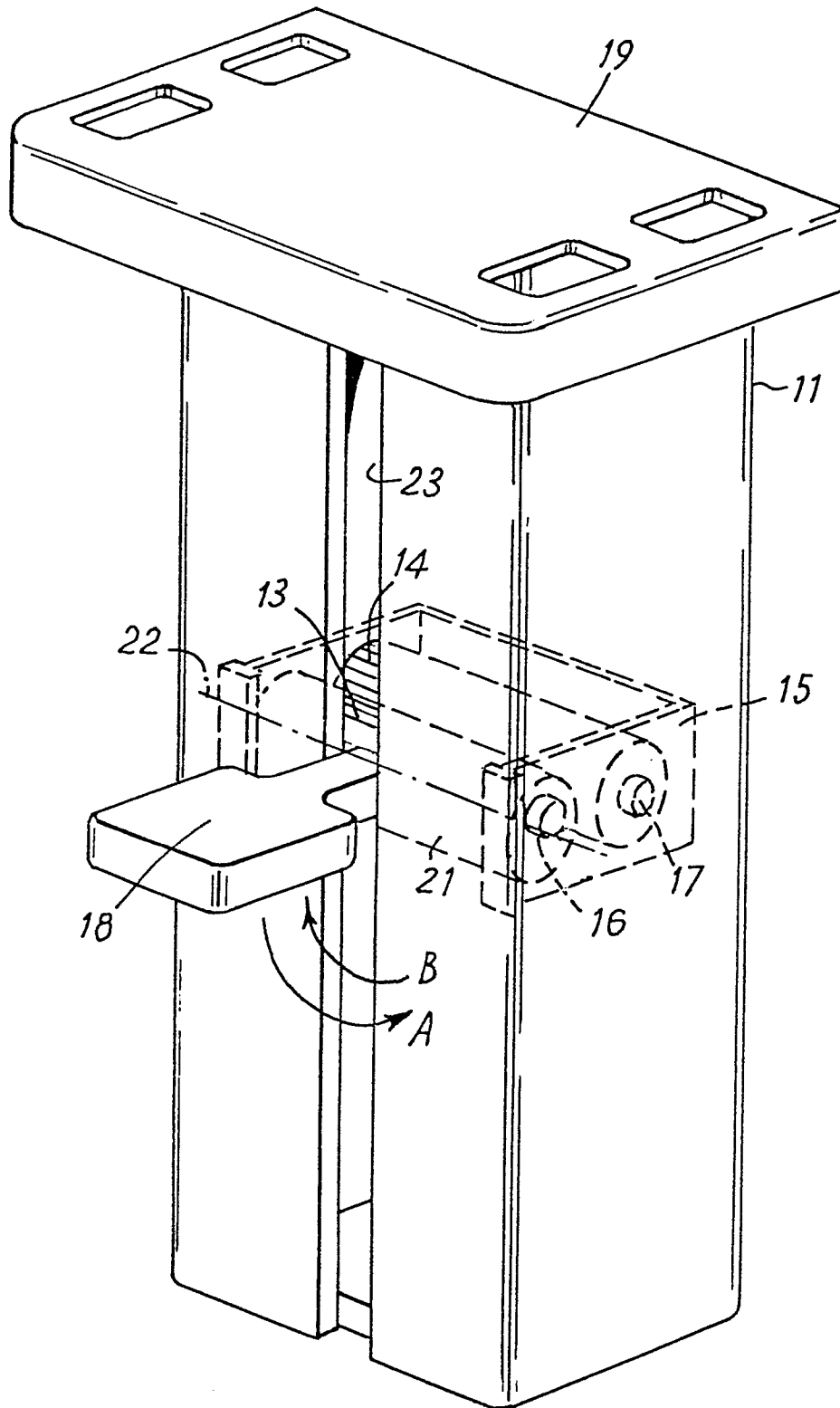
CLAIMS

1. A dispenser for use in dispensing a viscous substance from a manually compressible tube with an outlet nozzle, for example, a tooth paste tube, the dispenser comprising a support 11 for the tube 10 and a frame 15 which is movable relative to and guided by the support 11 for movement along the tube 10 and which carries first and second squeezing member 13 and 14 for engaging opposite sides of the tube 10, the first squeezing members 13 being pivoted on the frame 15 and being coupled to a lever 18, operable by the user whereby the user can rotate the first squeezing member 13 about its pivot axis 16, and the second squeezing member 14 also being pivoted on the frame about a pivot axis 17; the surface 21 of the first squeezing member 13 being so disposed relative to its pivot axis 16 that rotation of the first member 13 in a first direction A causes it initially to move towards the second squeezing member 14 to nip and to press the tube 10 against the second squeezing member 14 so that subsequently the second squeezing member 14 is caused to rotate whereby the first and second squeezing members 13 and 14 roll on the surfaces of the tube so that the areas of contact between the first and second squeezing members 13 and 14 and the tube 10 move along the tube towards the nozzle 20, rotation of the first member in a direction B opposite to the first direction causing the first squeezing member 13 to move away from the second squeezing member 14, allowing the frame 15 to move along the tube towards the nozzle 20.

2. A dispenser according to claim 1 characterised in that the surface 21 of the first squeezing member 13 is convexly curved in a plane normal to the axis 16 of rotation so that, initially, rotation of the first member in the first direction causes the first member 13 to move continuously toward the second 14.
3. A dispenser according to claim 1 or 2 characterised in that the first squeezing member comprises a cylindrical roller 13 mounted for rotation about an axis 16 parallel to and spaced from its central longitudinal axis 22.
4. A dispenser according to any of the preceding claims in which the second squeezing member comprises a cylindrical roller 14 mounted for rotation about its central longitudinal axis 17.
5. A dispenser according to claim 4 when appendant to claim 3 characterised in that the pivot axes 16 and 17 of the two rollers 13 and 14 are positioned so that they lie in a plane substantially perpendicular to the longitudinal axis 25 of the tube when the rollers are nipping the tube.
6. A dispenser according to any of the preceding claims characterised in that the surface of at least one of the first and second squeezing members is adapted to grip the tube to prevent the tube slipping between the rollers.

7. A dispenser according to claim 6 characterised in that the surfaces of the first and second squeezing members are knurled so as to grip the tube.
8. A dispenser according to claim 1 in which the lever 18 extends radially outwards from the surface of the first squeezing member 13.
9. A dispenser according to any of the preceding claims in which the support comprises a housing 11 for receiving the tube, the internal surface 24 of the housing serving to guide the frame 15 in its movement relative to the tube.

FIG. 1





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	US-A-2 574 797 (C.F.NELSON) *Column 1, line 54 to column 3, line 26; column 3, line 61 to column 5, line 5; figures 1 to 7*	1-9	B 65 D 35/28
X	--- US-A-2 509 518 (C.F.NELSON) *Column 2, line 20 to column 4, line 34; figures 1 to 4*	1,2,3,8,9	
X	--- GB-A-2 052 434 (R.W.PARK) *The whole document*	1,2,4,5,8,9	
A	--- US-A-1 784 752 (J.RIES)		
E,X	--- GB-A-1 602 298 (ON APPLICANT'S NAME) *The whole document* (Filed 31st May 1978; published 11th November 1981) -----	1-9	TECHNICAL FIELDS SEARCHED (Int. Cl. 3) B 65 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 07-07-1982	Examiner MARTENS L.G.R.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			