March 17, 1970 R. E. MAURICE 3,501,054

COLLAPSIBLE TUBE DISPENSING MECHANISM

Filed Jan. 2, 1969 3 Sheets-Sheet 1

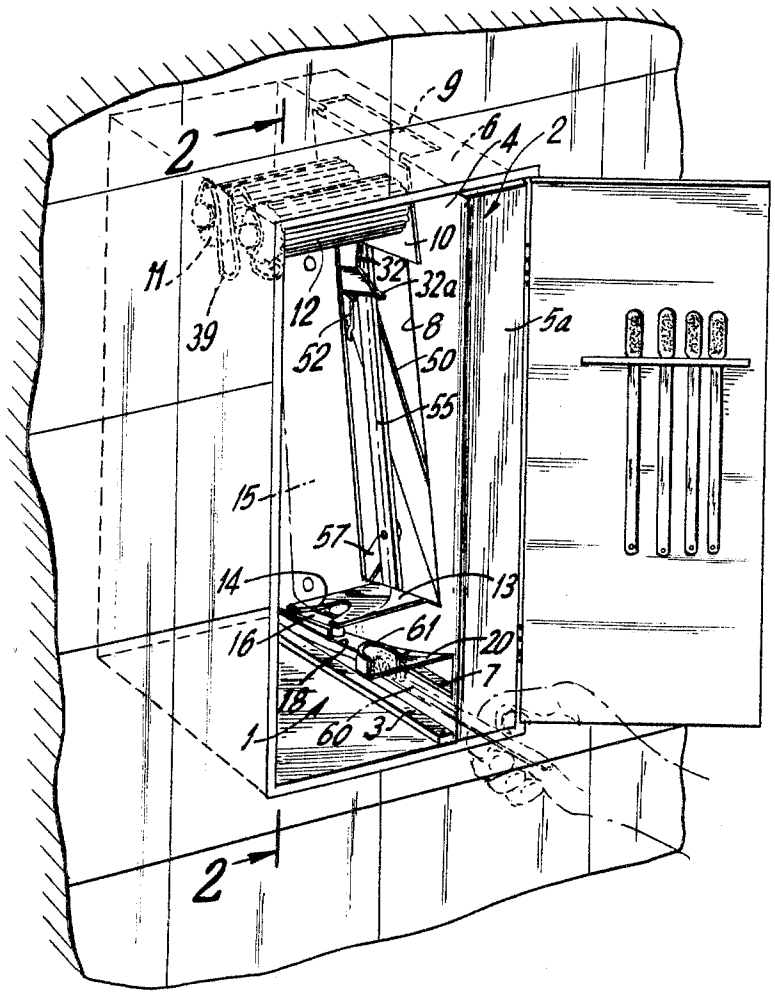


FIG.1

INVENTOR.
REGINALD E. MAURICE

BY

Morgan, Finnegan, Durham & Pine
ATTORNEYS.

March 17, 1970 R. E. MAURICE 3,501,054

COLLAPSIBLE TUBE DISPENSING MECHANISM

Filed Jan. 2, 1969 3 Sheets-Sheet 2

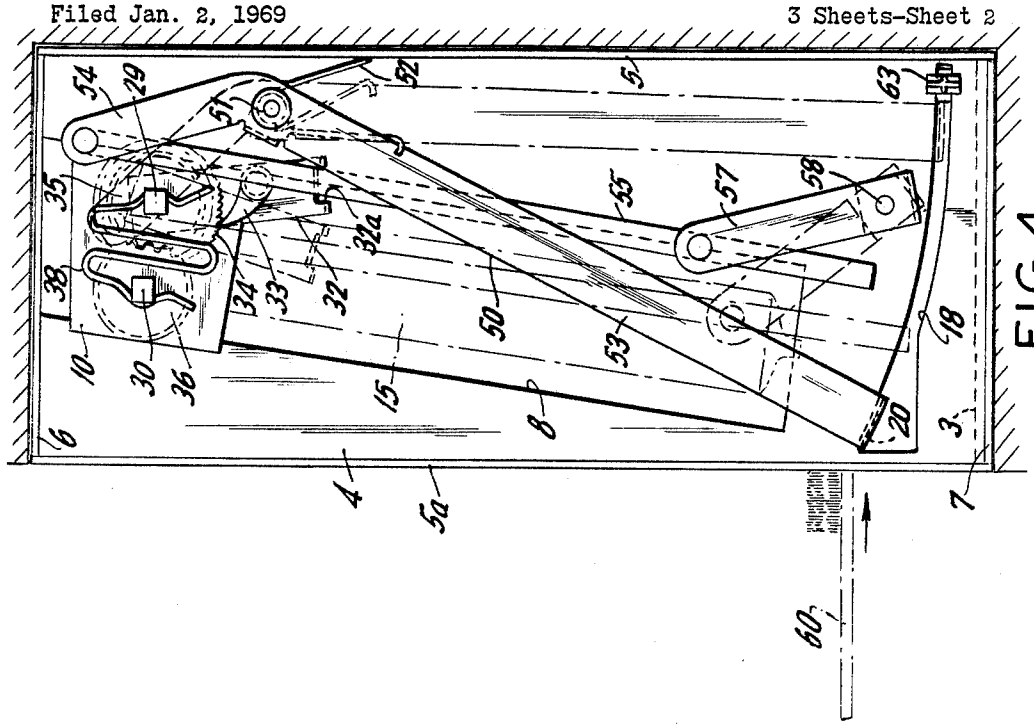


FIG. 4

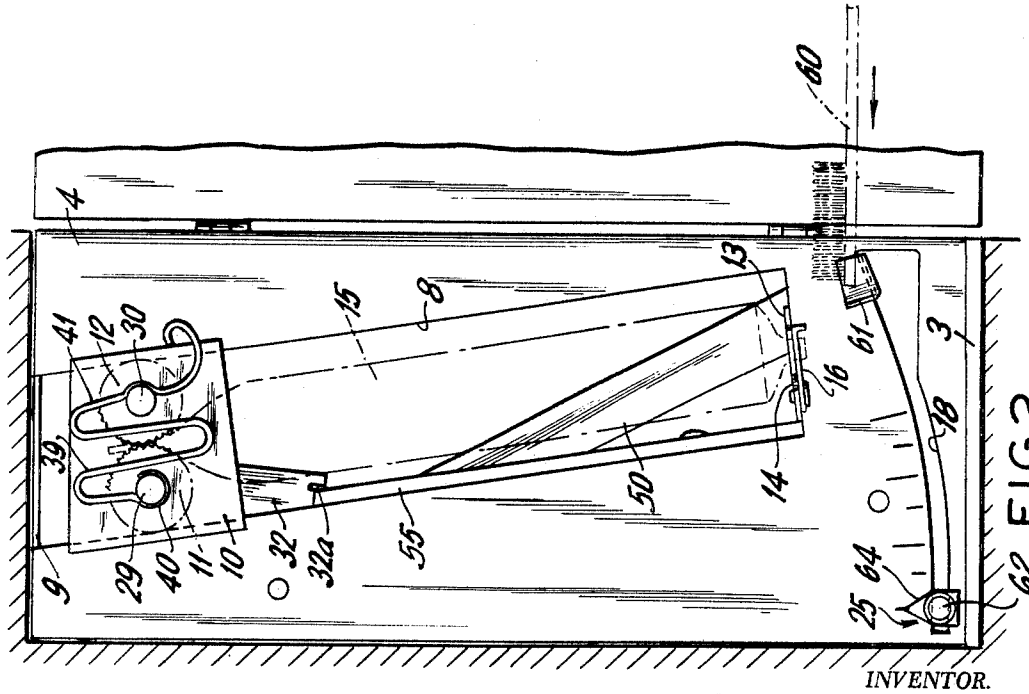


FIG. 2

INVENTOR.
REGINALD E. MAURICE

BY

Morgan, Finnegan, Durham & Pine
ATTORNEYS

March 17, 1970 R. E. MAURICE 3,501,054

COLLAPSIBLE TUBE DISPENSING MECHANISM

Filed Jan. 2, 1969 3 Sheets-Sheet 3

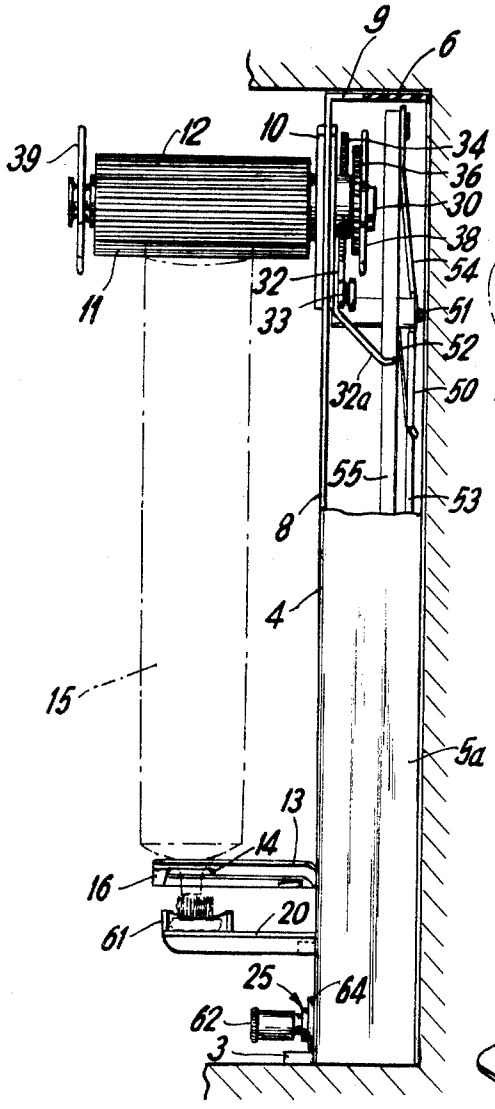


FIG.3

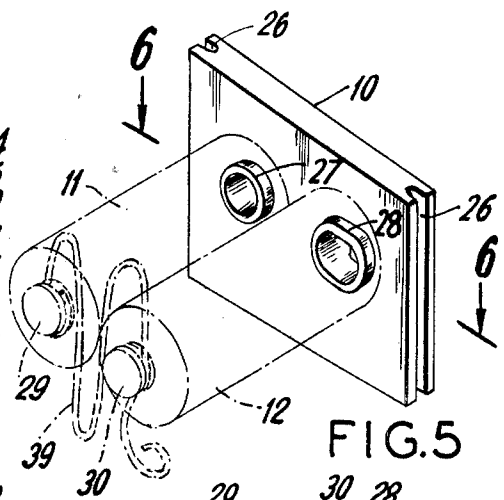


FIG.5

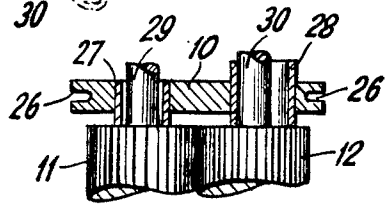


FIG.6

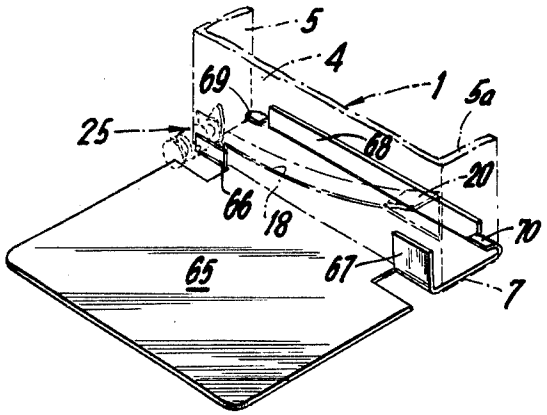


FIG.7

INVENTOR.
REGINALD E. MAURICE

BY

Morgan, Finnegan, Durham & Pine
ATTORNEYS

United States Patent Office 3,501,054
Patented Mar. 17, 1970

3,501,054

COLLAPSIBLE TUBE DISPENSING MECHANISM

Reginald E. Maurice, 58 Ranney St.,
Springfield, Mass. 01108

Filed Jan. 2, 1969, Ser. No. 788,385
Int. Cl. B65d 35/28
U.S. Cl. 222—102 13 Claims

ABSTRACT OF THE DISCLOSURE

A dispensing mechanism in which the closed end of an inverted collapisble tube is inserted between a pair of freely vertically mounted, intermittently unidirectionally driven, pressure rollers, whereby the rollers travel linearly down the length of the tube in step-wise fashion, intermittently expelling the contents thereof through the tube nozzle. The pressure rollers are driven, and a variable, predetermined quantity of material expelled, by pivoting a bell crank through an arc of adjustable length. The pressure rollers are mounted so as to spring apart during reloading to facilitate inserting the collapsible tube therebetween. The mechanism also dispenses the contents of the tube with a delaying action so that material expelled therefrom may be removed only during the return stroke of the bell crank.

BACKGROUND AND OBJECTS OF THE INVENTION

The present invention relates generally to dispensing mechanisms of utility especially in extruding materials packaged in collapsible tubes, and relates more particularly to certain new and useful improvements in such dispensing mechanisms.

The desirability of mechanical dispensing mechanisms over hand-pressing for expelling the contents of a collapsible tube has been previously recognized. The numerous prior proposals for such mechanisms, however, have not performed satisfactorily, or have been complicated to use, or expensive to manufacture and, accordingly, either have not reached, or have not been accepted by, the general consumer public.

It is therefore an object of this invention to provide a new and improved dispensing mechanism.

Another object of this invention is to provide a new and improved dispensing mechanism of utility especially in extruding materials packaged in collapsible tubes.

Another object of this invention is to provide a new and improved dispensing mechanism for extruding materials packaged in collapsible tubes which eliminates the aforementioned disadvantages of the prior proposals for such dispensing mechanisms.

Another object of this invention is to provide a new and improved dispensing mechanism which is economical to manufacture, rugged in construction, efficient in operation, and easily used by both children and adults.

Another object of this invention is to provide a dispensing mechanism which is capable of dispensing material with equal facility from collapsible tubes of greatly varying size.

Another object of this invention is to provide a new and improved dispensing mechanism which is capable of dispensing the entire contents of a collapsible tube at regulable, predetermined amounts from tubes of greatly varying size and of dispensing such amounts uniformly throughout the length of the tube.

Another object of this invention is to provide a new and improved dispensing mechanism which is capable of dispensing the contents of a collapsible tube completely free of any smearing of the contents on the nozzle of the tube and, when used to dispense toothpaste onto a toothbrush, also completely free of any smearing of the toothpaste on the brush bristles.

Objects and advantages of the invention are set forth in part herein and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

SUMMARY OF THE INVENTION

Briefly described, the present invention is directed to a new and improved dispensing mechanism for extruding a variable, predetermined amount of material from a collapsible tube, of particular usefulness for dispensing toothpaste onto a toothbrush.

The collapsible toothpaste tube is mounted in an inverted position with the closed end inserted between a pair of knurled pressure rollers mounted to a support plate which is freely verticallly slidable in a supporting frame. The pressure rollers are unidirectionally rotated in intermittent, step-wise fashion and, hence, travel linearly down the length of the tube, intermittently expelling uniform amounts of toothpaste from the nozzle thereof.

The pressure rollers are rotated by a ratchet gear which, in turn, is driven by a pawl carried by a ratchet lever rotatably mounted at one end about one of the pressure roller shafts and slidably receiving at the other end a generally vertically extending pressure bar, the latter being generally horizontally reciprocated by pivotal movement of a bell crank. A thrust-receiving, toothbrush receptory dispensing bar is latterally appended to the end of one arm of the bell crank and extends to a point beneath the tube nozzle, whereupon pivotal movement of the bell crank by a toothbrush deposits the toothpaste on the brush bristles.

The ratchet lever slidably receives the pressure bar in an open channeled foot portion which is of sufficiently greater width than the width of the pressure bar to provide a delay time between the start of the pivotal movement of the bell crank and the subsequent rotation of the pressure rollers. The delay time is preferably of sufficient duration to permit the dispensing bar to move past the tube nozzle before material is extruded therefrom so that it is removed only on the return stroke of the dispensing bar, thereby eliminating any smearing of the material on the tube nozzle or dispensing bar, or bristles of a toothbrush where toothpaste is being dispensed from the tube and the dispensing bar is pivoted with the toothbrush.

The pressure roller shafts are supported only at the ends which pass through the bearing housings provided in the support plate and are held in tension against one another by spring clips attached to the opposite ends of the shafts. One of the bearing housings is elongated so as to be of substantially greater width than the diameter of the roller shaft passing therethrough, whereby upon disengaging the outer spring clip for reloading of the dispensing mechanism, the inner spring clip causes the rollers to spread apart at their outer, unsupported ends, thereby facilitating the removal of the spent tube therefrom and the insertion of a fresh tube between the rollers.

The pressure bar is pivotally mounted at its upper end to the upper arm of the bell crank and also at its lower end to an equalizing lever, which, in turn, is pivotally mounted to the mechanism support frame. The equalizing lever is sufficiently longer than the upper arm of the bell crank so as to compensate for the decreased mechanical advantage obtained as the ratchet lever approaches the lower end of the pressure bar. Thus, the ratchet lever is

otated a constant distance as it slides down the pressure ›ar and, consequently, a uniform quantity of material is ›xpelled from the collapsible tube upon each actuation of he dispensing mechanism.

The dispensing bar laterally appended to the bell crank ›xtends through an arcuate slot in the support frame vhich accommodates the arcual swing of the bar upon ›ivotal movement of the bell crank. Adjustable stop means n the arcuate slot limits the length of arc through which he bar swings so as to provide a variable, predetermined quantity control on the amount of material dispensed rom the tube.

It will be understood that the foregoing general descrip- ion and the following detailed description as well are ›xemplary and explanatory of the invention but are not 'estrictive thereof. Thus, while the dispensing mechanism of this invention is particularly adapted to and was ›rimarily designed for use in dispensng toothpaste from ı collapsible tube, the principles underlying the objects of the invention are not limited to such usage. However, ›ince the invention is particularly adaptable to such usage, 'eference will be made hereinafter thereto in order to ›rovide an example of a practical and useful embodiment of the invention.

The accompanying drawings, referred to herein and ›onstituting a part hereof, illustrate the preferred embodi- nents of invention, and together with the description, ›erve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a fragmentary perspective view, partly diagrammatic, of a dispensing mechanism embodying the ›resent invention, the view illustrating the mechanism nounted in the wall of a bathroom and utilized to dis- ›ense toothpaste from a collapsible tube;

FIGURE 2 is a view in front elevation, partly diagram- natic, taken along line 2—2 of FIGURE 1;

FIGURE 3 is a view in side elevation, partly diagram- natic and partly in section, of the dispensing mechanism of FIGURE 1, the upper portion of the side frame panel ›eing illustrated broken away to show the ratchet drive and pressure roller gear mechanism of the invention;

FIGURE 4 is a view in rear elevation, partly diagram- natic, of the dispensing mechanism of FIGURE 1, the view depicting, in solid lines, the position of the operating levers of the dispensing mechanism at rest in the starting position and, in dashed-dotted lines, the position of the levers at the end of the forward stroke of the bell crank lever and just prior to its return to the starting position;

FIGURE 5 is an enlarged perspective view, partly diagrammatic, of the pressure roller support plate of the dispensing mechanism of FIGURE 1;

FIGURE 6 is a fragmentary section view, partly in elevation, taken along line 6—6 of FIGURE 5; and

FIGURE 7 is a fragmentary perspective view, partly diagrammatic, of an alternative mounting arrangement for the dispensing mechanism of FIGURE 1, the view showing the support frame for the dispensing mechanism releasably mounted to a flat base plate.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to the embodiments of the invention shown in the accompanying drawings, there is illustrated a dispensing apparatus, indicated generally by reference numeral **1**, mounted in a suitable recess in the wall of a bathroom, preferably for use in dispensing toothpaste from a collapsible tube, such as is presently commercially available. Advantageously, as illustrated, the wall recess is covered by a hinged door having toothbrush holding means mounted to the inner surface thereof. The dispensing apparatus frame supporting the actual dispensing mechanism, designated generally by reference numeral **2**, is slidably received in the recess and held in place by retaining rail **3**.

Supporting frame **2** includes a front panel **4**, side panels **5**, **5a**, and top and bottom panels **6**, **7**, respectively. Advantageously, the back of frame **2** is open, although it will be understood that a suitable back panel may also be provided if it is desired to have a completely enclosed housing for the dispensing mechanism.

In accordance with the invention, supporting frame **2** is provided with track means which extend generally vertically and parallel to the collapsible tube carried by the frame.

As here preferably embodied, this track means is formed by providing the front frame panel **4** with a rectangular slot **8** extending angularly from the top of the panel and terminating near the bottom thereof, as best seen in FIGURE 2. Another slot **9**, equal in width to slot **8**, extends from the top of slot **8** into the top frame panel **6** so as to permit slot **8** to vertically slidably receive a support plate **10** carrying a pair of pressure rollers **11**, **12**, more fully described hereinafter.

A tube support plate **13** extends laterally outwardly from front panel **4** at the bottom of slot **8**. As here preferably embodied, the outer edge of support plate **13** is formed with a generally V-shaped cut-out **14** for receiving the nozzle of the collapsible toothpaste tube depicted diagrammatically at **15**, and includes a suitably pivoted clamp **16** for firmly holding the nozzle in place upon mounting tube **15** on the support plate.

A second slot **18** extends in an arcuate direction transversely across the lower end of the front frame panel **4** beneath the rectangular slot **8**, for accommodating the arcual path of travel of a dispensing bar **20**, more fully described hereinafter. Arcuate slot **18** also includes adjustable stop means **25** for limiting the distance of travel of dispensing bar **20** and, hence, providing a variable, predetermined quantity control on the amount of material dispensed, also more fully described hereinafter.

As previously mentioned, a pair of pressure rollers **11**, **12** are carried by a support plate **10**, the latter being mounted so as to freely vertically slidable in rectangular slot **8**. To this end, the generally vertically extending edges of support plate **10** are each recessed to provide channeled grooves **26** which slidably receive the edges of rectangular slot **8**.

In accordance with the invention, pressure rollers **11**, **12** are mounted so as to be supported at one end only and to be normally urged apart at their unsupported ends so as to facilitate and simplify the insertion of the closed end of an inverted collapsible tube therebetween when loading the dispenser mechanism.

To this end, as best seen in FIGURES 5 and 6, support plate **10** is provided with bearing housings **27**, **28**, in which the shafts **29**, **30** of the respective pressure rollers **11**, **12** are journalled, bearing housing **28** being transversely elongated so as to be of greater width than the shaft **30**.

Mounted for rotation about shaft **29** on the back face of support plate **10** is ratchet drive lever **32** carrying pawl **33** which, in turn, is suitably spring-pressed into meshing engagement and serves to drive ratchet gear **34** secured to shaft **29** for rotation therewith. A pinion gear **35** is also secured to shaft **29** for rotation therewith and, in turn, meshes with and serves to drive pinion gear **36**, secured to shaft **30**. It will be seen (FIGURE 6) that bearing housing **28** is of greater length than the width of support plate **10**, so as to space pinion gear **36** from support plate **10** a distance equal to the combined width of the ratchet lever and gear **32**, **34**, which are mounted to shaft **29**.

The ends of the pressure roller shafts **29**, **30** are each advantageously circumferentially grooved to receive tensioning wire spring clips **38**, **39**, which serve to press the rollers **11**, **12** against each other and to lock the pinion gears **35**, **36** in meshing engagement. The outer spring clip **39** is mounted so as to be easily and quickly removable from tensioning engagement with rollers **11**, **12** and,

to this end, is fixedly rotatably hooked at **40** to shaft **29** while removably affixed to shaft **30** by spreading the clip until the open end **41** may be hooked about shaft **30**.

It will be understood from the foregoing that the pressure to be exerted between the pressure rollers **11, 12** may be selectively determined by varying the thickness of the wire from which the spring clips **38, 39** are formed. It has been found that a spring clip having the required pressure for thoroughly extruding toothpaste from a collapsible tube may nevertheless be manually spread apart with ease during the mounting and removal of the clip on the pressure roller shafts.

It will also be apparent from the foregoing that, upon removal of outer spring clip **39** from shaft **30**, the pressure rollers **11, 12** are urged apart at their unsupported ends by the inner spring clip **38**, the latter causing the shaft **30** of pressure roller **12** to pivot in the transversely elongated bearing housing **28** in a direction away from roller **11**. The spaced distance of the inner spring clip **38** from the support plate **10** permits the unsupported ends of pressure rollers **11, 12** to be spread open a sufficient distance for receiving the closed end of the collapsible toothpaste tube therebetween, facilitating reloading of the dispenser mechanism.

In accordance with the invention, means are provided for driving the pressure rollers in step-wise fashion at variable, predetermined increments of rotational distance so that the rollers intermittently progressively move in a linear direction down the length of the collapsible tube, dispensing uniform amounts of toothpaste therefrom throughout their entire distance of travel.

To this end, as best illustrated in FIGURE 4, the dispensing bar **20** is mounted to the lower end of the free arm **53** of a bell crank **50** pivotally mounted at **51**, whereby dispensing bar **20** travels in an arcual path defined by the slot **18**. A spring **52** bearing against side frame panel **5** and arm **53** biases crank **50** and, consequently, dispensing bar **20** laterally appended thereto, toward the end of slot **18** nearest the opposite side frame panel **5***a*, herein designated the starting position.

A pressure bar **55** is pivotally connected at its upper end to the upper arm **54** of bell crank **50** and is also pivotally connected near its lower end to an equalizing lever **57**, the latter, in turn, being pivotally mounted at **58** to the front frame panel **4**. Pressure bar **55** is operatively associated with and serves to drive ratchet lever **32** by means of the channeled foot portion **32***a* thereof, which slidably receives the pressure bar therewithin.

It will be apparent from the foregoing that, upon exerting a suitable force or thrust against dispensing bar **20**, bell crank **50** pivots about point **51**, causing the dispensing bar to travel in the arcual path defined by slot **18**. Upon release of the force or thrust applied to dispensing bar **20**, spring **52** returns crank **50** to the original starting position. The pivotal movement of crank **50** transmits a generally horizontal and slightly vertical reciprocating motion to pressure bar **55** which, in turn, imparts a leveraged tangential force to ratchet lever **32**, driving the latter in a back-and-forth oscillating motion about shaft **29**. The oscillating motion of ratchet lever **32**, in turn, intermittently unidirectionally rotates ratchet gear **34** by means of the pawl **33** to thereby drive the pinion gears **35, 36** and, consequently, pressure rollers **11, 12** in a similar step-wise fashion.

It will be understood that, by means of the freely vertically slidable mounting of the pressure roller support plate **10** in slot **8** and of the ratchet lever **32** about pressure bar **55**, as the pressure rollers **11, 12** rotate they move a corresponding linear distance downwardly on the collapsible tube **15**, expelling a quantity of toothpaste from the tube.

By providing equalizing lever **57**, for a given displacement of bell crank **50**, ratchet lever **32** is displaced a corresponding distance by the pressure bar **55** at any point along its entire length. Hence, the preset quantity of toothpaste to be dispensed from tube **15** at each actuation of the dispensing mechanism is uniformly dispensed until the entire contents of the tube have been expelled. Advantageously, equalizing lever **57** is slightly longer than the upper arm **54** of bell crank **50** so as to compensate for the decreased mechanical advantage obtained as the ratchet lever **32** approaches the lower end of pressure bar **55**.

Advantageously, and as preferably embodied, pressure rollers **11, 12** are suitably knurled, as best seen in FIGURE 2, to insure against slippage as they travel along the collapsible tube. Also advantageously, particularly when the dispensing mechanism is used to dispense toothpaste onto a toothbrush, indicated diagrammatically at **60**, a brush receptory trough **61** is provided on dispensing bar **20**.

In accordance with the invention, the contents of the collapsible tube **15** are dispensed completely free of any smearing on the nozzle of the tube and, when used to dispense toothpaste onto a toothbrush, completely free of any smearing of the toothpaste on the brush bristles.

To this end, means are provided for delaying the actuation of the feeding mechanism until the dispensing bar **20** has passed beneath the tube nozzle on its forward, thrust stroke. As here embodied, this delaying action is accomplished by enlarging the channel in the ratchet lever foot **32***a* so as to be of greater width than that of pressure bar **55**, as illustrated in FIGURE 4. Hence, upon initial forward pivotal movement of bell crank **50**, pressure bar **55** moves to the opposite side of the ratchet channel without any corresponding movement in the ratchet lever **32**. Upon pressure bar **55** reaching the opposite side of the channel, whereupon the ratchet lever is rotated and toothpaste begins to be expelled from the tube, the dispensing bar has moved beyond the tube nozzle.

In addition, it will be seen from the foregoing description that the contents of collapsible tube **15** are expelled during the forward, thrust stroke of dispensing bar **20**, and that the arcual path of travel of dispensing bar **20** creates a substantial clearance between the dispensing bar and tube nozzle as the forward stroke progresses. Thus, where the contents of the collapsible tube have a viscosity on the order of that of commercial toothpaste, upon completion of the forward, thrust stroke of dispensing bar **20**, a length of toothpaste has been extruded from the collapsible tube and remains suspended from the tube nozzle. Thereafter, upon release of the forward thrust on the dispensing bar, the extruded toothpaste is deposited on the thrust-exerting means, such as toothbrush **60**, as the dispensing bar is returned to the starting position by spring **52**.

As previously mentioned, arcuate slot **18** includes adjustable stop means **25** for limiting the distance of travel of dispensing bar **20** and, hence, providing a variable, predetermined quantity control over the amount of material dispensed at each acutation of the dispensing mechanism. As here embodied, stop means **25** comprises a control knob **62** threadedly releasably lockably engaging stop washer **63** carried by a pointer **64** slidably received in slot **18**. Hence, a variable, predetermined quantity of toothpaste may be dispensed from the tube **15** by threadedly locking the control knob **62** to the pointer **64** at the desired location along slot **18**.

Referring now more particularly to FIGURE 7 of the accompanying drawings, there is illustrated an alternative mounting arrangement for the dispensing mechanism embodied herein, which may be used when it is not desired to mount the mechanism in a custom-built, recessed bathroom wall unit. As embodied, the alternative mounting arrangement comprises a flat base plate **65**, advantageously cut-out along two opposed edges to form upstanding front retaining tabs **66, 67** and formed with a back retaining tab **68** therebetween. Also advantageously, the ends of the back retaining tab **68** are bent over at **69, 70**. Thus, the bottom panel **7** of the dispensing mechanism

upport frame 2 is inserted under tabs 69, 70 and held n place on the plate by the retaining tabs 66, 67, 68. n this manner, the dispensing apparatus may be stored nd operated, for example, in the medicine cabinet of bathroom, without further fastening means.

It will be seen from the foregoing that the dispensing nechanism herein described and illustrated accomplishes he stated objects of the invention. Thus, by driving the ressure rollers directly and mounting them for free ertical movement, the mechanism may be quickly and asily adapted to collapsible tubes of greatly varying ize, the tube need not be supported at the upper end hereof and it will not bend or fold or otherwise jam s the pressure rollers travel from its one end to the ther, and essentially the entire contents of a collapsible ube are efficiently dispensed without the creation of any rinkles or pockets. By driving the pressure rollers by neans of a bell crank pivoting through an arc and proiding a delayed action in the dispensing motion, where oothpaste or the like is being dispensed, no material is leposited on the toothbrush during the forward, feed troke of the crank, and thus, when picked up on the reurn stroke, the material is cleanly and neatly deposited without smearing the material on the tube nozzle or on the bristles of the brush. By mounting one of the pressure rollers in an elongated bearing housing, upon removal of the outer roller tensioning clip, the rollers are urged to spring open at their outer, unsupported ends, thereby facilitating the insertion of the collapsible tube therebetween during reloading of the dispensing mechanism. Finally, the equalizing lever causes the pressure bar to be displaced horizontally an equal distance over its entire length to thereby rotate the pressure rollers a constant distance and, consequently, dispense the desired, preset amount of material uniformly from the tube until the entire contents thereof have been expelled.

The preceding description and accompanying drawings relate primarily to the use of the dispensing mechanism of the invention for dispensing toothpaste from a collapsible tube. However, as previously mentioned, it will be understood that the dispensing mechanism of the invention is not limited to such usage, but is equally applicable for use in dispensing any product packed in a collapsible tube and requiring pressure to be expelled therefrom, such as glues, shampoos, soaps, shaving creams, hair creams, and the like. Also, while the dispensing mechanism of this invention is particularly adaptable for use with products having a viscosity such that they will remain suspended from the tube nozzle during the forward stroke of the dispensing bar to be picked up on the return stroke thereof, the invention obviously is not limited to such usage.

Thus, the invention in its broader aspects is not limited to the specific embodiments herein shown and descirbed but departures may be made therefrom without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. A device for dispensing material from collapsible tubes, comprising:

frame means for supporting a collapsible tube from the nozzle thereof in an inverted, generally vertical position and a pair of pressure rollers adapted to receive the collapsible tube therebetween,

said frame means including track means extending generally parallel to the collapsible tube;

support means freely slidably received on said track means,

said support means incldung means mounting said pair of pressure rollers for rotation in compression against one another about said collapsible tube;

drive means for intermittently unidirectionally rotating said pressure rollers, whereby said rollers travel step-by-step in a linear direction along the length of the collapsible tube, intermittently expelling the contents out of the tube nozzle,

said drive means including a dispensing bar which normally rests approximately directly beneath the collapsible tube nozzle and actuates the drive means upon being moved through a forward path of travel; and

means for delaying the rotation of said pressure rollers by said drive means until said dispensing bar is moved to a point forwardly of said tube nozzle, whereby material expelled from said tube is removed therefrom only during the return stroke of said dispensing bar.

2. The device as defined in claim 1, wherein said pressure roller drive means further includes:

a bell crank member pivotally mounted to said support frame so as to have upper and lower pivoting arms,

said dispensing bar extending laterally from the bottom free end of the lower pivoting arm of said bell crank,

an equalizing lever also pivotally mounted to said support frame at one end thereof,

a pressure bar member pivotally mounted to said upper pivoting arm of said bell crank and the free end of said equalizing lever so as to extend generally parallel to said track means and said collapsible tube,

whereby pivotal movement of said bell crank generally horizontally reciprocates said pressure bar,

gear means secured to said pressure rollers for rotation therewith, and

ratchet lever means pivotally mounted at one end to said support means, including

means for slidably receiving said pressure bar in operative association therewith, whereby horizontal reciprocation of said pressure bar oscillates said ratchet lever means about its pivotal mounting, and

carrying pawl means engaging said gear means, whereby oscillation thereof serves to unidirectionally drive both said gear means and said pressure rollers.

3. The device as defined in claim 2, wherein the pivotal length of said equalizing lever is sufficiently longer than that of the upper arm of said bell crank so as to compensate for the decreased mechanical advantage obtained as the ratchet lever means approaches the lower end of the pressure bar.

4. The device as defined in claim 2, wherein said gear means includes:

a ratchet gear secured to one of said pressure rollers and

a pinion gear secured to each of said pressure rollers, said pinion gears mounted in meshing engagement with one another, and

said pawl means engages said ratchet gear to thereby drive the latter and said pressure rollers upon oscillation of said ratchet lever means.

5. The device as defined in claim 2, wherein said ratchet lever means is mounted for rotation about the pressure roller carrying said ratchet gear, and

the means slidably receiving said pressure bar in operative association with said ratchet lever means comprises an open channel slot formed in the free end of said ratchet lever means,

whereby said ratchet lever means pivots about said pressure roller upon engagement of said pressure bar with a side wall of said channel slot.

6. The device as defined in claim 5, wherein the width of said channel slot in said ratchet lever means is sufficiently greater than that of said pressure bar so that said dispensing bar moves to a point forwardly of the col-

lapsible tube nozzle before said pressure bar engages the side wall of said channel slot.

7. The device as defined in claim 1, including adjustable means for regulating the length of the forward stroke of said dispensing bar, whereby a variable, predetermined quantity of material is dipsensed from the collapsible tube upon each actuation of the dispensing bar.

8. The device as defined in claim 7, wherein said frame means includes slot means for accommodating the path of travel of said dispensing bar, and

said adjustable means comprises stop means releasably fixedly mounted in said slot means.

9. The device as defined in claim 1, wherein said means mounting said pressure rollers includes means normally urging the rollers apart at one end thereof to thereby facilitate the removal of a spent tube therefrom and the insertion of a fresh tube therebetween.

10. The device as defined in claim 9, wherein the mounting means for said pair of pressure rollers includes:

a mounting shaft extending axially from each end of each of said pressure rollers;

bearing housing means journalling one of said mounting shafts of each of said pressure rollers in said support means, the other of said mounting shafts of each of said pressure rollers being unsupported;

one of said bearing housing means having a width greater than the diameter of said mounting shafts; and

tensioning means removably fixedly secured between the unsupported mounting shafts of said pressure rollers;

whereby, upon removal of said tensioning means from the unsupported ends of the pressure roller mounting shafts, the pressure roller jounalled in the enlarged bearing housing means is urged away from the other pressure roller by the tensioning means remaining secured to the pressure roller mounting shafts.

11. The device as defined in claim 1, wherein said frame means further includes removable base plate means adapted to mount the device in position for use.

12. A device for dispensing commercial toothpaste from a collapsible tube, comprising:

frame means for supporting the collapsible tube from the nozzle thereof in an inverted, generally vertical position and a pair of pressure rollers adapted to receive the collapsible tube therebetween,

said frame means including slot means extending generally parallel to said collapsible tube;

support means freely slidably received in said slot means,

said support means including means mounting said pair of pressure rollers for rotation in compression against one another about said collapsible tube,

drive means for intermittently unidirectionally rotating said pressure rollers, whereby said rollers travel step-by-step in a linear direction along the length of the collapsible tube, intermittently expelling toothpaste out of the tube nozzle.

said drive means including a dispensing bar which normally rests approximately directly beneath the collapsible tube nozzle and actuates the drive means upon being pivoted through a forward arcual path of travel,

said dispensing bar including toothbrush receptory means, whereby said bar may be pivoted by exerting a forward thrust on a toothbrush placed in said receptory means; and

means for delaying the rotation of said pressure rollers by said drive means for a time sufficient to permit said dispensing bar to be pivoted to a point forwardly of said tube nozzle;

whereby toothpaste is expelled from said tube on the forward stroke of said dispensing bar, remains suspended from the tube nozzle at the end of said forward stroke, and is deposited on the toothbrush during the return stroke of said dispensing bar to its normal rest position.

13. A method for dispensing commercial toothpaste or the like from collapsible tubes, comprising:

positioning a collapsible tube in an inverted, generally vertical position;

supporting a pair of pressure rollers for free, generally vertical movement together in compressed relationship to one another;

placing the closed end of said collapsible tube between said pair of pressure rollers;

providing a dispenisng bar normally at rest approximately directly beneath the nozzle of said collapsible tube;

intermittently unidirectionally rotating said pressure rollers by a driving mechanism actuated by forward movement of said dispensing bar, whereby said rollers travel step-by-step in a linear direction along the length of said collapsible tube, intermittently expelling the contents out of the tube nozzle; and

delaying the rotation of said pressure rollers by said driving mechanism until said dispensing bar is moved to a point forwardly of said tube nozzle, whereby material expelled from said tube is removed therefrom only during the return stroke of said dispensing bar.

References Cited

UNITED STATES PATENTS

2,563,733 8/1951 Meczelski ---------- 222—102

STANLEY H. TOLLBERG, Primary Examiner