Jan. 7, 1936. E. CAIRNS 2,026,864

CABINET FOR COLLAPSIBLE TUBES

Filed Feb. 11, 1935

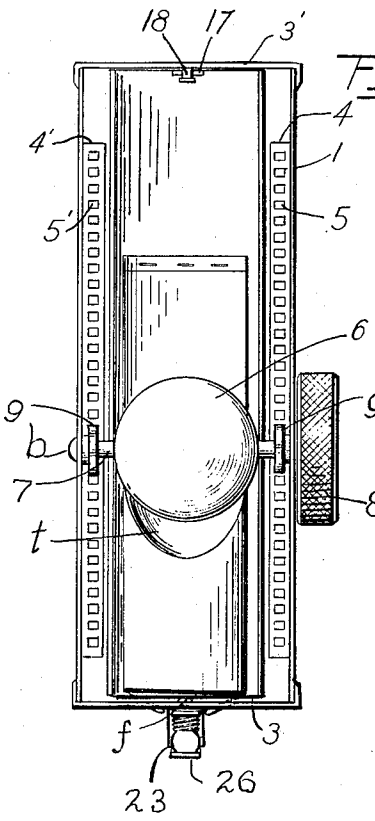


Fig. 1.

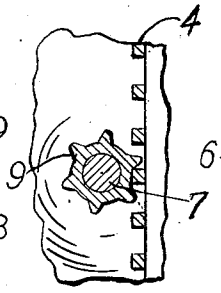


Fig. 2.

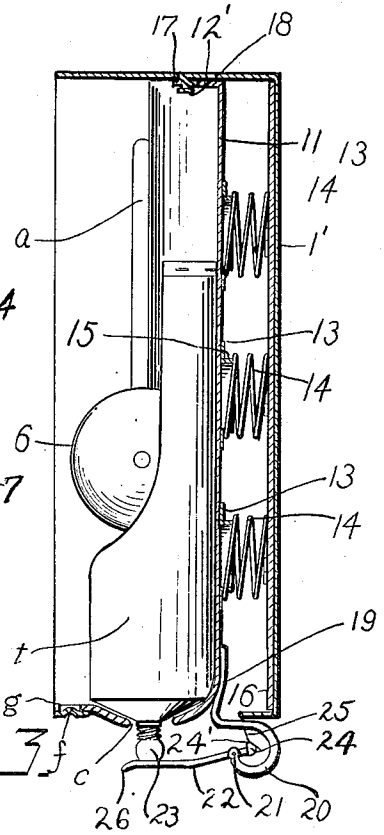


Fig. 3.

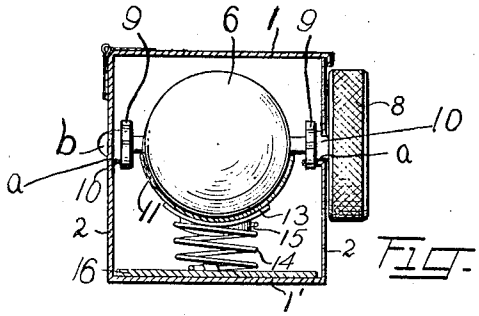


Fig. 4.

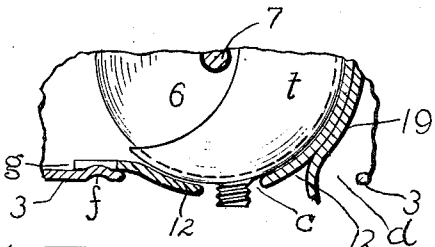


Fig. 7.

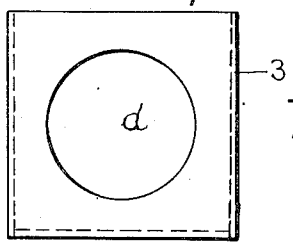


Fig. 6.

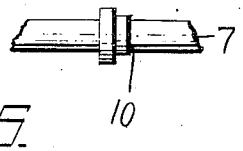


Fig. 5.

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Patented Jan. 7, 1936 2,026,864

UNITED STATES PATENT OFFICE

2,026,864

CABINET FOR COLLAPSIBLE TUBES

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Application February 11, 1935, Serial No. 5,969

8 Claims. (Cl. 221—60)

This invention relates to the dispensing of tooth paste, shaving cream and toilet preparations and other substances that are in a pasty or liquid state that are contained in collapsible tubes and has for its particular objects the provision of a simple, compact and cheap cabinet or device into which a collapsible tube can be conveniently inserted and which cabinet not only serves as an attractive permanent holder for such tube until such time as it is desired to discard the tube, but more especially is adapted to smoothly dispense the entire contents thereof in easily regulated charges as required onto a brush or other desired implement. Further objects of the invention are hereinafter set forth.

Heretofore, as I am well aware, it has been proposed, as set forth for example in Patent No. 1,845,291 to provide a collapsible tube dispensing cabinet which was equipped with cooperating squeezing rollers adapted to be operated by a rack and pinion movement, and which rollers serve to effect the compression of the tube and the consequent discharge of the contents through the terminal aperture thereof in regulated charges. However, such construction, by virtue of the fact that the compression members constituted rollers, was not capable of effecting the discharge of the entire contents of the tube with the consequence that a substantial amount of the tooth paste or other article being dispensed would remain in the collapsed tube when removed from the cabinet, and this fact of itself tended to interfere with the general adoption of such a device for household use. Furthermore, the construction so disclosed in said patent was far more complicated and expensive to construct than is desirable, since in a device of this nature the question of cost to the user is almost of equal importance insofar as the appeal of the article to the purchaser is concerned as is the question of the performance of the effectiveness of the functioning thereof.

My investigations have led to the discovery of a novel dispensing cabinet for collapsible tubes which possesses all of the advantages of the most desirable prior art construction, besides having additional advantages which accentuate the appeal thereof to the purchaser and which cabinet is hereinafter described in detail.

In the accompanying drawing forming a part of this specification in which I have illustrated a preferred embodiment of my invention

Figure 1 is a longitudinal plan view of a collapsible tube dispensing device embodying my invention, with the cover removed;

Fig. 2 is a fragmentary, detail vertical section of a rack and its co-operating pinion;

Figs. 3 and 4 are vertical longitudinal and transverse sections, respectively, partly in elevation, of the dispensing device shown in Fig. 1;

Fig. 5 is a fragmentary, detail vertical section of the device showing the spherical compression member at the end of its stroke;

Fig. 6 is a plan view of the bottom end plate; and

Fig. 7 is a detail, fragmentary elevation of the shaft and one of the spacing washers.

Referring to the drawing and construction shown therein, the reference numeral 1 designates an elongated casing or container of rectangular cross-section, the same having front and rear faces, 1, 1', respectively, and opposing sides, 2, 2', that are preferably formed integral with the rear face. Said casing is closed at the respective ends by caps 3, 3', the same being preferably brazed thereto. Each of the opposing sides of said casing is provided with an elongated longitudinally extending slot *a*, the said slots being oppositely disposed with respect to each other. Inwardly projecting, integral flanges, 4, 4' are struck-up from the respective side pieces 2, 2', the same being provided with perforations 5, 5', thus forming racks which co-operate with pinions hereinafter described.

A spherical compression member 6 is loosely mounted on a shaft 7 that extends completely across said casing and projects through said slots *a*, said shaft having a knurled knob 8 rigidly fixed to one end thereof for effecting rotation thereof and being peened over at the other end, as indicated by the reference letter *b*, so as to thereby prevent any side-play thereof. Opposing pinions 9, the teeth of which are adapted to mesh with the respective racks 5, 5', are rigidly secured to said shaft and preferably shouldered spacing washers 10 are interposed on said shaft between said pinions and the knob 8 and end *b*, respectively, the reduced ends of said washers being of a somewhat lesser diameter than the slots *a* through which they project.

A trough-like tube-carrier member 11, which serves as a co-operating anvil for the compression member 6, extends longitudinally within the casing, the same having an integral, curvilinear, apertured breast member 12 at the lower end thereof and a substantially horizontal offset fork or guide 12' at its upper end. Said member 11 is preferably supported on separate saddles 13 and coil springs 14, which respectively embrace struck-up shoulders or ribs 15 on said saddles,

are secured at their opposite ends to a plate 16 and serve to resiliently support these saddles and the carrier 11 mounted thereon. The said breast member 12 has an aperture c formed therein for the reception of the threaded neck of a collapsible tube t when the latter is mounted on the tube carrier 11. Said guide 12' has a slot 17 formed therein which is adapted to receive a rivet-like member 18 carried by the cap 3', thereby limiting the extent of the transverse movement of said member 11, besides serving to positively suspend the carrier from the top cap 3'.

A closure-supporting arm 19 is brazed or otherwise secured to the member 11 adjacent the lower end thereof, said arm projecting through the opening d in the bottom cap and which opening is of a diameter somewhat greater than the maximum transverse dimension of the curvilinear portion of the breast 12, thus admitting of the free movement of the tube carrier, within the limits permitted by the said rivet 18, transversely within the casing. Such arm 19 is formed into a substantial loop, as indicated by the reference numeral 20, and the free end of such arm constitutes a fulcrum 21 for a lever arm 22 on which is mounted, adjacent its free end, a ball-shaped cap or closure member 23 that serves to effectively seal the end of the tube t when the arm 22 is in a substantially horizontal or so-called sealing position. At the other end of such lever arm is a boss 24 which has a cam-face 24' that is adapted to co-operate with a spring 25 and normally retain said lever arm either in said horizontal sealing position or else in vertical dispensing position, as desired. The tip of said arm 22 projects slightly beyond the ball-closure 23, such tip being arched downwardly to form a finger-piece 26, thus admitting of the closure being conveniently flipped open by the operator with one finger of the same hand that carries a tooth brush or the like at the movement the same is presented to the end of the collapsible tube mounted in the cabinet. The aforesaid manner of mounting of the arm 19 on the carrier insures that the fulcrum of the lever arm 21, that is pivotally secured thereto, will always be at the same radial distance from the center of the opening c in the breast 12 and consequently the ball-shaped closure element 23 will be automatically centered when in engagement with the neck of a tube that has been mounted in said cabinet in the manner hereinbefore specified, irrespective of the transverse dimension of such tube, and accordingly such closure element will effectively seal the discharge opening in such neck.

Preferably a detent f is formed on the cap 3 which is adapted to normally project into a slot g that is cut in the edge of the breast member 12 and thereby the transverse movement of the front end of the carrier 11 is definitely restricted when a tube is removed and also the carrier is transversely guided within the casing, during any movement thereof, when inserting a new tube into the cabinet.

The compression member 6 is, as shown, loosely mounted on the shaft 7 whereby it is capable of relative rotation with respect thereto and thereby it is possible to attain just the correct peripheral speed of such compression member that is necessary to prevent slippage thereof as it rolls over the tube when the shaft 7 is rotated and caused to move downwardly over the rack members. As a consequence, there is no tendency, as would be the case were such speed excessive, for the compression member during its downward movement to exert an upward thrust on the collapsible tube, with the consequent retraction of the neck thereof through the aperture c, whereby such neck would be inaccessible to a brush in the hands of a user, nor, on the other hand, is there any tendency for the compression member to effect the buckling of the tube and thereby become jammed during its movement over the tube as would be likely to occur were its peripheral speed too slow. Heretofore, in an attempt to prevent the retraction of a tube through the opening in the bottom of a dispensing cabinet, in those cases where cylindrical compression rollers rigidly mounted on their respective shafts have been employed for exerting a squeezing action upon the tube in order to discharge the contents thereof, it has been proposed to positively clamp the neck of the tube to the cabinet in order to prevent its retraction into the cabinet during the movement of the rollers thereover.

My improved compression member, while preferably spherical in configuration, may also be formed as a sphere having the ends thereof that are in proximity to the side walls of the casing slightly flattened or else of ovoid shape, as obviously such compression members would be what might be appropriately termed generally or substantially spherical and would have a curvilinear periphery in the plane that includes the axis of the shaft which carries such compression member and consequently would function substantially the same, when associated with a tube-carrier member whose outer face conforms to that of the contact face of the compression member, as does a true sphere.

In the operation of my improved device, there is no tendency for the tube to become crumpled up either when the compression member passes over the clipped end thereof or during the subsequent movement of said compression member, owing to the effective co-operation between the resiliently mounted tube carrier and the generally spherical compression member, since the tube carrier can yield to any extent necessary and the tube itself is collapsed by the spherical member 6 to assume the exact shape of the top face of the carrier. Likewise, as previously stated, owing to the fact that the curvature of the breast 12 conforms generally to the curvature of spherical member 6, and to the normal curvature of the breast of the tube, the entire contents of the tube can be completely expelled when the compression member has reached the extreme end of its downward travel within the casing.

In lieu of providing co-operating perforations in the rack members to receive the teeth of the pinions 9, the flanges 4, 4' may be provided with corrugations or teeth thereon which are struck-up therefrom by a stamping operation. While I have disclosed the employment of an insert plate 16, which serves as an anchorage for the springs 14, such plate may be dispensed with and if desired, the springs can be secured directly to the rear face 1' of the casing.

In order to introduce a new collapsible tube into the cabinet, the cover 1 is first opened to afford access thereto, the knob 8 is then rotated in a clockwise direction, to retract the compression member 6 to the upper end of the cabinet and any empty tube therein is removed. The clipped or rear end of a fresh tube, while the same is still sealed with the original sealing cap, is bent to approximately assume a curve which conforms to the curvature of the concave face of the carrier 11 and such tube is then positioned on

the carrier 11 so that its breast portion will snugly engage the curvilinear portion of the breast 12 and the neck of such tube will project centrally through the aperture c of such breast member. Thereupon the knob 8 is manually rotated in an anti-clockwise direction sufficiently to cause the compression member 6 to ride over and pinch the clipped end of the tube, whereby such tube will be positively held at both of its ends against accidental displacement. The said cover is then closed, the sealing cap removed from the tube and then the closure arm 22 is manually moved into the closed or substantially horizontal position, as shown in Fig. 3, whereby the ball-closure element 23 will effect the sealing of the discharge aperture in the neck of the tube.

When it is desired to remove a regulated charge of the contents of a collapsible tube so mounted in the cabinet, the closure-supporting arm 22 is flipped open with the finger, whereupon it will assume and be retained in a substantially vertical position by the spring 25, a tooth brush or other desired implement or article is then moved into a receptive position beneath the discharge end of the tube and the regulated charge is then projected thereon by manually effecting partial rotation of the knob 8. The brush or article carrying the charge so projected thereon is then withdrawn and the arm 22 returned to the sealing or substantially horizontal position, wherein it is retained by the spring 25.

When a tube is positioned in the device in the manner herein described, the reduced end of the washers 10 will constantly engage with the front edges of the slots a owing to the pressure exerted thereon, via the tube t and shaft 7, by the spring-pressed carrier 11, and at no time will there be any unusual thrust or pressure exerted upon the racks other than that essential to accomplish the downward movement of the compression member 6 through rotation of the pinions 9.

The cabinet is preferably screwed to an ornamental plate or bracket that is in turn fastened to a wall or to the inner face of the door of a medicine cabinet or otherwise.

While I have illustrated and described herein certain preferred forms of the invention, it is understood that there is no limitation intended as to the precise features so set forth and that various modifications thereof within the scope of the appended claims may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim and desire to obtain by United States Letters Patent is:—

1. In a dispensing device for collapsible tubes, the combination comprising a main casing adapted to be attached to a suitable support and a tube carrier member resiliently supported within said casing, a substantially spherical compression member mounted in said casing to one side of said carrier member and adapted to co-operate therewith to effect a squeezing action upon a collapsible tube interposed therebetween, and means for causing said compression member and said carrier member to effect the progressive collapse of a tube so inserted therebetween.

2. In a dispensing device for collapsible tubes, the combination comprising a main casing having longitudinal slotted side walls, longitudinal rack members extending along one of the longitudinal margins of each of said slots, a shaft projecting transversely through said casing and through each of said slots, means for retaining said shaft against transverse movement with respect to the casing, pinions carried by said shaft, a substantially spherical compression member interposed on said shaft between said pinions, a tube carrier member of arcuate cross-section resiliently mounted in said casing and extending substantially throughout the entire length thereof, said carrier member having a curvilinear apertured breast portion at one end thereof, the curvature of which conforms substantially to the curvature of the breast portion of an ordinary collapsible tube, and means for effecting the step-by-step longitudinal movement of said compression member along a tube positioned on said carrier for progressively effecting the collapse of said tube and dispensing the contents thereof in regulated charges.

3. In a dispensing device for collapsible tubes, the combination comprising a casing having slotted side walls, rack members respectively disposed immediately adjacent the slot in each side wall, a collapsible tube carrier of arcuate cross-section, resiliently mounted in said casing, said carrier having an apertured curvilinear terminal breast portion, a shaft extending through the said opposing slots and provided with pinions arranged thereon so as to respectively mesh with the said racks, means mounted on one end of said shaft for effecting manual rotation thereof, a substantially spherical compression member centrally mounted on said shaft and free to rotate relatively thereto, said spherical member normally engaging said tube carrier when the device is empty.

4. In a dispensing device for collapsible tubes, the combination comprising a casing, a tube carrier mounted therein and transversely movable with respect thereto, means for limiting such transverse movement of such carrier, a compression member adapted in co-operation with said tube carrier to effect the compression of a tube interposed therebetween, means for causing the longitudinal travel of said compression member and the consequent progressive collapse of a tube interposed between said carrier and said compression member, a tube closure member carried by said carrier member adjacent the end thereof and movable therewith and means for positively holding said closure member in either an open or a closed position as desired.

5. In a dispensing device for collapsible tubes, the combination comprising a main casing adapted to be attached to a suitable support, said casing having longitudinally slotted side walls and having integral oppositely disposed racks extending inwardly from said side walls adjacent one longitudinal margin of each such slot, a shaft projecting transversely across said casing and extending through each of said slots, means including a terminal knob on said shaft for preventing accidental escape of said shaft from its position in said slot, pinions mounted on said shaft and so positioned thereon as to respectively cooperate with each of said racks, a substantially spherical compression member loosely mounted on said shaft intermediate said pinions, a tube carrier resiliently mounted in said casing and extending substantially the entire length thereof, means for limiting the transverse movement of said carrier in one direction, said carrier having a curvilinear breast portion at one end thereof which is adapted to project through one end of said casing, a closure-support arm carried by said carrier and a closure member pivotally mounted on said support arm.

6. In a dispensing device for collapsible tubes,

the sub-combination comprising a casing, a tube-carrier resiliently mounted therein and extending substantially throughout the major portion of the length thereof, said tube-carrier having a breast member at one end thereof, the major portion of which is of curvilinear configuration, and said casing having an aperture at one of its ends of substantially greater diameter than the maximum width of the curvilinear portion of said breast.

7. In a dispensing device for collapsible tubes, the sub-combination comprising a casing, a tube-carrier resiliently mounted therein and extending substantially through the major portion of the length thereof, said tube-carrier having a breast member at one end thereof, the major portion of which is of curvilinear configuration, and said casing having an aperture at one of its ends of substantially greater diameter than the maximum width of the curvilinear portion of said breast, means positioned at one end of said casing for suspending said carrier and means for transversely guiding said carrier during its movements within the casing.

8. In a dispensing device for collapsible tubes, the combination comprising a casing, a tube carrier resiliently mounted therein, and means for suspending said carrier from one end of said casing so as to facilitate the transverse movement of such carrier without undue binding of the same against the casing during the charging of a tube in the device.

EDWARD CAIRNS.