Sept. 19, 1933. H. W. COLE 1,927,112

CONTAINER FOR COLLAPSIBLE TUBES

Filed April 7, 1932 2 Sheets-Sheet 1

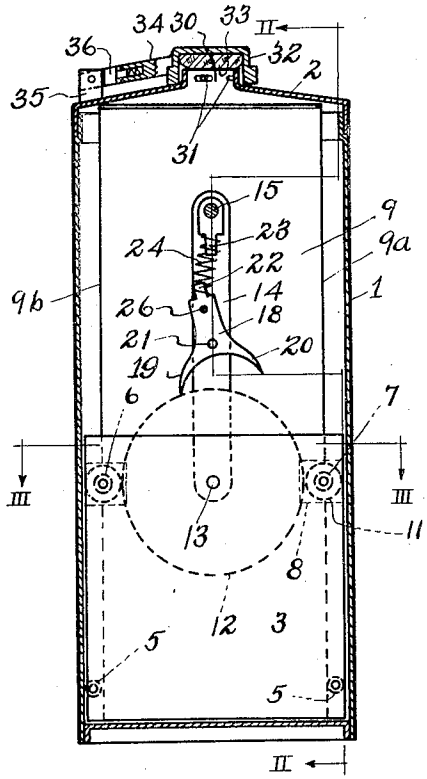


Fig. I

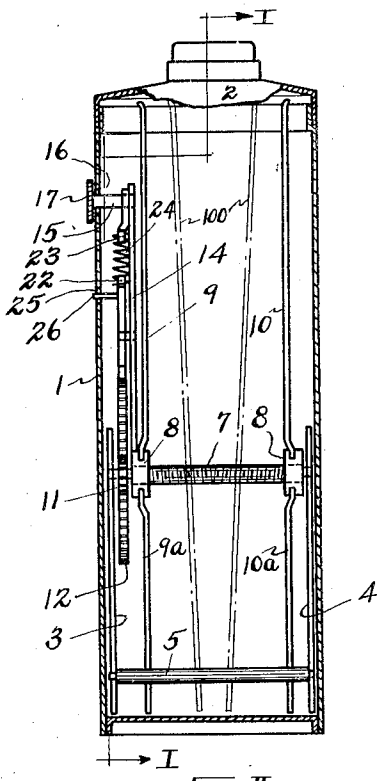


Fig. II

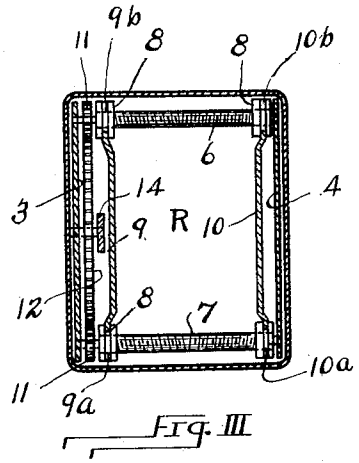


Fig. III

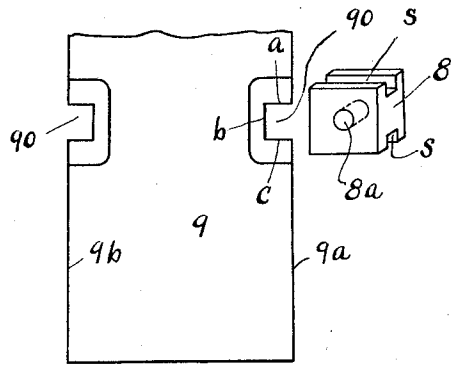


Fig. IV

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CONTAINER FOR COLLAPSIBLE TUBES

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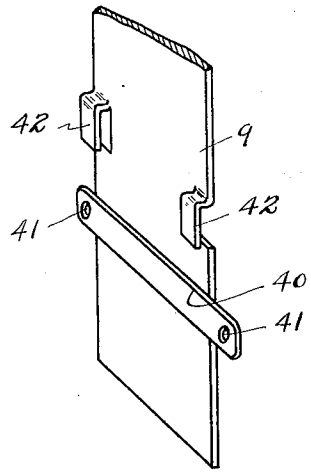


Fig. V

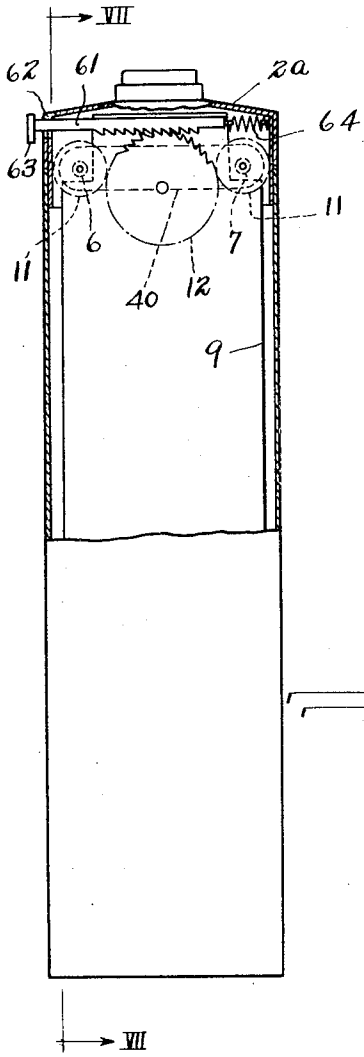


Fig. VI

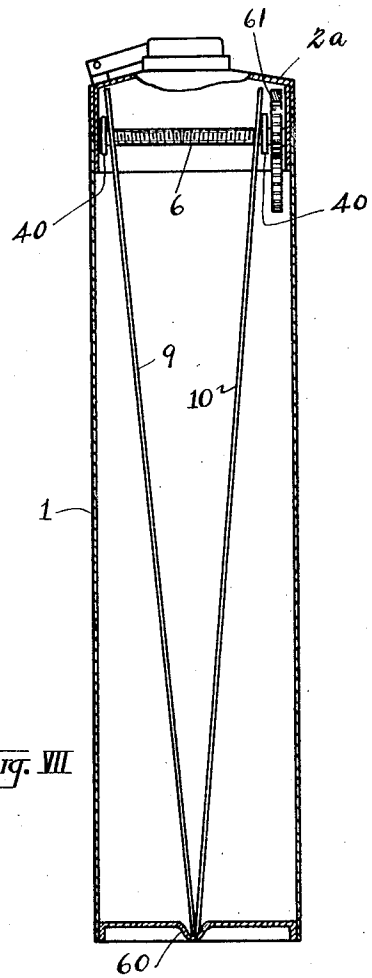


Fig. VII

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UNITED STATES PATENT OFFICE

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CONTAINER FOR COLLAPSIBLE TUBES

Howard W. Cole, Pittsburgh, Pa.

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6 Claims. (Cl. 221—60)

My invention is directed to a container for collapsible tubes, a container of pleasing appearance and in which a tube—a tube of tooth paste, for example—may be kept.

It is a matter of common knowledge that the squeezing of a collapsible tube between the fingers affords very little control over the quantity of material ejected from the tube, and, when the tube is partly emptied, say half emptied of its contents, it becomes still more difficult to effect the desired discharge. Additionally, the usual cap provided for the mouth of the tube becomes fouled or clogged in service, and at best creates a messy condition at the top of the tube. To overcome these objections, I provide a container in which a collapsible tube may be stored, and within the container I organize mechanism for compressing the tube and effecting ejectment of its contents in nicely controlled quantities. In using my container the above-mentioned cap, which is ordinarily employed to cover the outlet of the tube, will not be needed, once the collapsible tube has been placed in the container.

I am aware that others before me have considered this subject, and have developed apparatus for the same general purposes. So far as I am aware, however, prior structures have either been too costly for universal adoption, or have failed because of poor mechanical construction. The object of my invention is to provide an improved device of the nature indicated. I aim at economy in production and mechanical efficiency in service.

In the accompanying drawings Fig. I is a view of the container in vertical section, taken on the plane I—I of Fig. II. Fig. II is a view in vertical section, taken on the planes II—II of Fig. I. Fig. III is a view in cross-section taken on the plane III—III of Fig. I. Fig. IV is a fragmentary view of one of the presser plates of the device, and also shows an isometric view of one of the nut members which is associated with such presser plate. Fig. V is a fragmentary view, showing a modification in structure of the presser plate. Fig. VI is a view, partly in side elevation and partly in vertical section, showing a modification in the mechanism organized within the container. And Fig. VII is a view of the modified structure, as it appears on the plane VII—VII of Fig. VI.

The illustrated embodiment of the invention comprises a housing or case 1, over which a removable cover 2 snugly fits. Conveniently, the case and its cover are formed of sheet metal, say of aluminum, brass, copper or steel sheeting, and externally the parts are enamelled, embossed, painted or otherwise decorated to suit the taste.

Within the case I provide a frame, to support the tube-compressing mechanism alluded to above. The frame includes two plates 3 and 4 which are united in spaced relation by means of two rods 5, the rods being in this case located near the lower edges of the plates and rigidly secured at their respective ends to the plates. Two screws or threaded stems 6 and 7 are revolubly supported by the paltes 3, 4; that is, the threaded stems 6, 7 are trunnioned in the plates 3, 4 at points near the top edges and immediately within the side edges of the plates. As may be perceived in Figs. II and III, the stems 6, 7 are each provided with two threads of opposite pitch extending from the middle of the stem outward and toward its opposite ends. Two nuts 8 are located on each stem (6, 7), the nuts 8 being threaded to correspond with threads on the opposite stem portions (6, 7) upon which they are fitted. Of course, upon restraining the nuts 8 against rotation, and upon rotating the threaded stems, the nuts will travel along the stems, either toward or away from one another according to the direction of rotation of the stems. As presently will be more fully explained, I organize two opposite presser plates 9 and 10 with the four nuts on stems 6, 7, and I so intergear the threaded stems that they are adapted to be rotated in unison, shifting the presser plates accordingly.

Fig. IV illustrates in detail one of the nuts 8. The nut is slotted (*s*) on three sides, the slots extending in common plane and perpendicular to the threaded bore 8*a* of the nut. Intermediate the length of each presser plate 9, 10 the opposite edges are provided with rectangular notches 90, and in each of these notches a nut 8 is positioned, the edges *a*, *b*, and *c* of the notches lying in the slots *s* of the nuts 8. The engagement between the nuts 8 and the edges of the notches 90 is loose, so that in assembly with the screws or stems 6, 7 the presser plates may move angularly with respect to one another (cf. dotted lines 100 in Fig. II). So it will be understood that the opposite companion edges 9*a*, 10*a* and 9*b*, 10*b* of the presser plates are in threaded association with the screws 6, 7, and rotation of the screws in unison effects the relative face-to-face movement of the presser plates 9, 10. Between the presser plates 9, 10 and the threaded stems 6, 7 is a region R, in which region a tube of tooth paste or the like is placed. Rotation of the stems 6, 7 may be effected, to close the presser plates 9, 10 upon the

opposite sides of the tube and powerfully compress it, effecting a discharge of its contents.

At this point it may be remarked that in locating the screws 6, 7 intermediate the length of plates 9, 10, and advantageously below the center line of the plates, I provide for the self adjustment of the plates against the collapsible tube between them. That is to say, rotation of the screws 6, 7 shifts the plates 9, 10 against the sides of the tube, and the plates in being (by means of nuts 8) tiltably connected to the screws, and the screws in being located below the center line of the plates, permits the plates to adapt themselves to the sides of the tubes, and to exert greatest pressure near the bottom of the tube (cf. dotted line position of the plates in Fig. II).

Secured to each threaded stem or screw 6, 7 is a pinion 11, and a gear 12 (mounted upon a pin 13 projecting from frame plate 3) interconnects the pinions 11, so that the pinions and their associated stems 6, 7 may be rotated in unison. Means are associated with the gear 12, to effect its step-by-step turning, to the end that the rotation of the stems 6, 7 and the relative movement of the presser plates 9, 10 may be nicely controlled, and the discharge of the collapsible tube correspondingly regulated.

Such means comprise an arm 14 pivotally borne by the pin 13; a stud 15 extends from the upper end of arm 14 and projects through a slot 16 in the wall of case 1. A thumb-plate 17 is attached to the stud 15, and, when the container is in the hand of the user, the thumb-plate 17 is shifted to and fro, effecting the oscillation of arm 14. A pawl 18 is carried by the arm 14, so that the oscillation of the arm effects a step-by-step turning of the gear 12 and the consequent discharge of material from the collapsible tube.

Advantageously, the pawl 18 is a compound pawl, including the two prongs 19 and 20. The pawl is pivotally connected at 21 to the arm 14, and above the point 21 the pawl is provided with a teat 22. The arm 14 is also provided with a teat 23 or the like, and mounted upon the opposed teats 22, 23 is a compressed spring 24. The arrangement of the pawl and spring is such that, when the teat 22 is adjusted to lie to the left of the center point 21 (cf. Fig. I), the prong 19 of the pawl rides the gear 12. Accordingly, oscillation of arm 14 will effect a counter-clockwise turning of gear 12, and will cause such rotation of the screws 6, 7 that the presser plates 9, 10 move toward each other, compressing the tube and ejecting its contents. Such adjustment of the pawl 18 remains so long as there is any material remaining in the tube; when, however, the tube has been completely collapsed and emptied, the pawl 18 is swung to its alternate position, the position in which teat 22 lies to the right of point 21. The prong 20 then rides the gear 12, and oscillation of arm 14 effects clockwise rotation of the gear 12. So the screws 6, 7 may be reversely rotated and the presser plates 9, 10 shifted to open position, in which position they are illustrated in Fig. II. The cover 2 is removed from case 1, the empty tube is removed from between the presser plates and screws, and a new tube is inserted. The cover is then replaced, and the pawl 18 swung to its first-mentioned position, whereupon the device is again ready for service.

To facilitate the adjustment of the pawl I provide a slot 25 in the side wall of housing 1, and on the pawl I integrate or secure a stem 26, accessible through such slot.

The cover 2 is provided with an open throat 30 in which the neck or tip (not shown) of the collapsible tube snugly nests. Indeed, I provide resilient barbs 31 (Fig. I) in the wall of throat 30, to the end that the fit of such neck within the throat 30 will be fairly tight. A cap 32, lined with cork 33, is adapted to cover the throat 30 and to close the mouth or orifice in the neck of the tube; the cover is integrated with an arm 34; arm 34 is hinged to a cam lug 35 rigidly secured on the cover 2; a spring-backed block 36 is included in arm 34, and, in accordance with known practice, the block 36 bears against the cam lug 35, tending to maintain the cap 32 in position of closure over the throat 30.

Instead of nuts 8, I may employ a bar 40 with each presser plate 9, 10. The bar 40 is provided with a threaded passage 41 at each of its opposite ends to fit the screws 6, 7. The presser plates have lugs 42 stamped and deflected from their opposite edges, as shown in Fig. V, and the bar 40 extends transversely of the plate and lies within the lugs 42. Manifestly, in assembly with the other parts, such structure will serve to the same end as the structure shown in Figs. I to IV.

A modification is illustrated in Figs. VI and VII. In this case the bottom edges of the presser plates 9, 10 rest together in a groove 60 in the bottom of the housing. The two screws 6, 7 are trunnioned in the top of the container, and the two bars 40, 40 are mounted on the screws externally of the presser plates. Pinions 11 and gear 12 are organized with the screws in much the same manner as they are in the apparatus of Figs. I—V. In the modified structure, however, I employ a rack 61 (Fig. VI) to effect the step-by-step rotation of the gear 12. The rack 61 is provided with slanting teeth on its nether edge, which teeth rest upon and mesh with the teeth of gear 12; the rack extends through a slot 62 in the top 2*a* and terminates outwardly of the housing in a button 63. A compression spring 64 backs the rack 61, and in service the button is pressed with the thumb, shifting the rack to the right (Fig. VI) and rotating the gear 12 through a corresponding interval. Upon releasing the button 63, the spring 64 thrusts the rack to the left, the rack (by reason of its inclined teeth) sliding over the teeth of the gear 12. So reciprocation of the rack 61 may be effected, and rotation of the screws 6, 7 is produced in unison, to press the plates 9, 10 against the collapsible tube and to effect discharge of its contents.

I claim as my invention:

1. A container for callapsible tubes comprising the combination of a housing, a pair of opposed plates in said housing, threaded stems operatively associated with said plates, one of such threaded stems being associated with each of the opposite companion edges and intermediate the longitudinal extent of the plates, and providing, between the plates and the stems, a region for the reception of a collapsible tube, and means for effecting the rotation of said stems in unison, whereby said plates are drawn together against said tube.

2. A container for collapsible tubes comprising the combination of a housing, a pair of opposed plates in said housing, threaded stems operatively associated with said plates, one of such threaded stems being associated with each of the opposite companion edges and intermediate the longitudinal extent of the plates, and providing, between the plates and the stems, a region for the reception of a collapsible tube, gearing interconnecting said stems, an arm pivotally mounted for oscillatory movement, a pawl carried by said arm and

co-operating with the teeth of said gearing, whereby the oscillation of said arm effects the turning of said gearing and the joint rotation of said threaded stems for shifting said plates relatively to each other.

3. A container for collapsible tubes comprising the combination of a housing, a pair of opposed plates in said housing, threaded stems operatively associated with said plates, one of such threaded stems being associated with each of the opposite companion edges and intermediate the longitudinal extent of the plates, and providing, between the plates and the stems, a region for the reception of a collapsible tube, gearing interconnecting said stems, an arm pivotally mounted for oscillatory movement within said housing, a pawl carried by said arm and co-operating with the teeth of said gear, a thumb plate connected to the distal end of said arm and providing externally of said housing means for effecting the oscillation of said arm, the oscillation of said arm effecting the turning of said gearing and the joint rotation of said threaded stems, whereby said plates are shifted relatively to each other and axially of said stems.

4. A container for collapsible tubes comprising the combination of a housing, a pair of opposed plates in said housing, threaded stems operatively associated with said plates, one of such threaded stems being associated with each of the opposite companion edges and intermediate the longitudinal extent of the plates, and providing, between the plates and the stems, a region for the reception of a collapsible tube, gearing interconnecting said stems, an arm pivotally mounted for oscillatory movement within said housing, a compound pawl carried by said arm and co-operating with the teeth of said gearing, means for adjusting said compound pawl in one of two alternate positions of service, whereby the oscillation of said arm effects the corresponding turning of said gearing in one of two alternate directions of rotation.

5. A container for collapsible tubes comprising the combination of a housing, a pair of opposed plates in said housing adapted to receive between them a collapsible tube, gear-actuated means for effecting the shifting of said plates relatively to each other, an arm pivotally mounted for oscillatory movement, a compound pawl carried by said arm and co-operating with the gearing of said means, means for adjusting said compound pawl in one of two alternate positions of service, whereby the oscillation of said arm effects the corresponding turning of said gearing in one of two alternate directions of rotation.

6. A container for collapsible tubes comprising the combination of a housing, a pair of opposed presser plates in said housing and extending in length with the housing, a screw in threaded association with each of the opposite companion edges of said plates, providing between the screws and plates a region for the reception of a collapsible tube, a pinion secured to each screw, a gear in mesh with said pinions, and means associated with said gear for effecting its step-by-step rotation and the corresponding rotation of said screws in unison.

HOWARD W. COLE.