

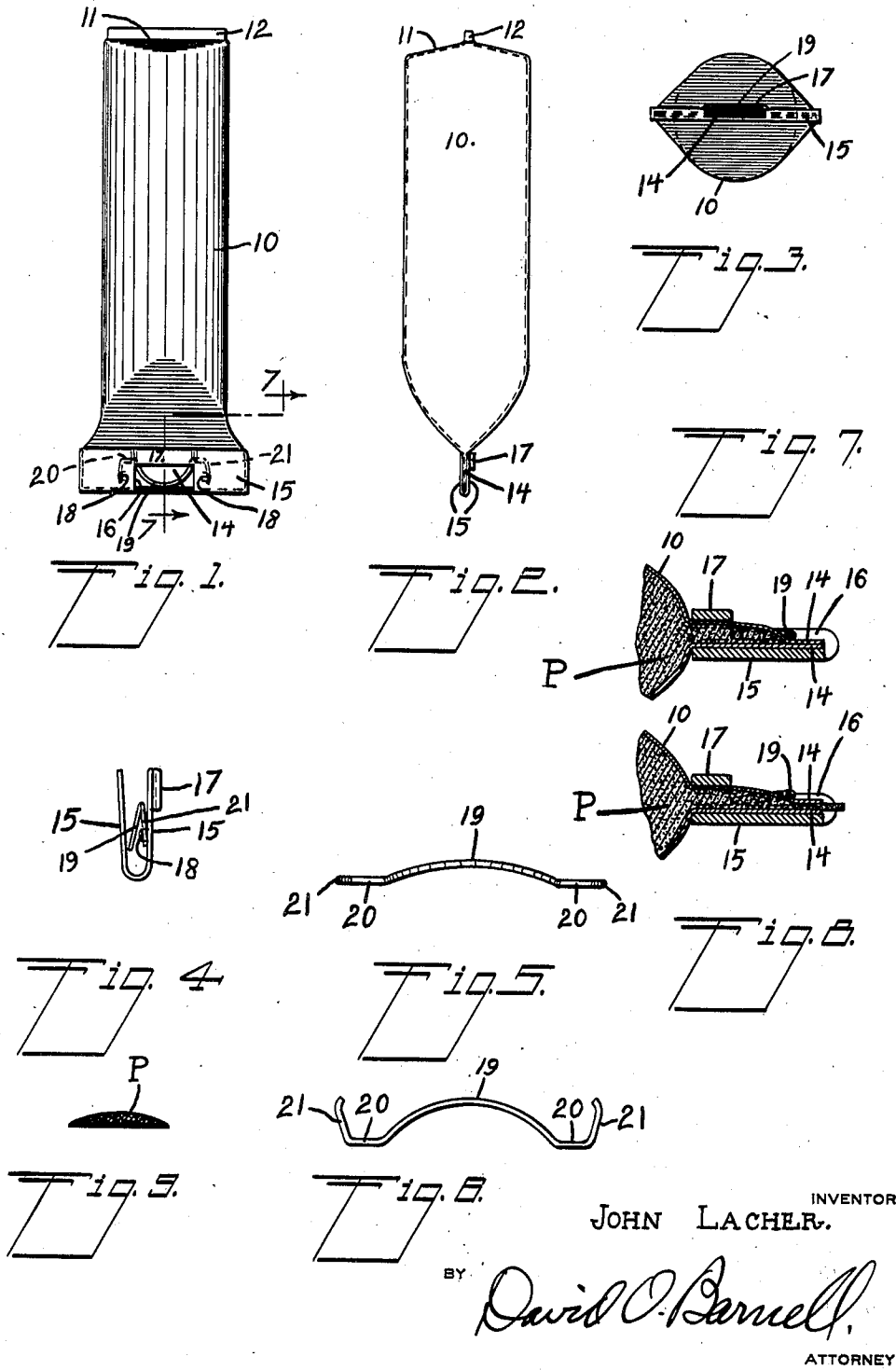
Feb. 6, 1934.

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1,945,612

CLOSING MEANS FOR COLLAPSIBLE TUBES

Filed April 18, 1932



UNITED STATES PATENT OFFICE

1,945,612

CLOSING MEANS FOR COLLAPSIBLE TUBES

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Application April 18, 1932. Serial No. 605,924

5 Claims. (Cl. 221-60)

My invention relates to means for closing collapsible tubes or containers for plastic material. It is the object of my invention to provide a simple, effective and inexpensive closure for containers of this class, the closure being adapted to enable dispensing or expulsion of the plastic contents of the container by the application of external pressure thereon, and to automatically resume a closing position or formation upon discontinuance of the applied external pressure. A further object is to provide a dispensing closure of the character described, wherein the plastic material is expelled from the container in the form of a strip or ribbon having thin pliable edges, whereby to readily conform with and cling to an object, such as a brush, to which the plastic ribbon is applied for use.

In the accompanying drawing Fig. 1 is a front view of a structure embodying my invention, Fig. 2 is a side view thereof, Fig. 3 is an end view of the same, Fig. 4 is a detail end view of the closing device separate from the tube, Fig. 5 is a detail side view of the closing spring alone, Fig. 6 is a plan view of the same, Fig. 7 is a detail longitudinal section on the line 7-7 of Fig. 1, showing the parts in closed formation, Fig. 8 is a similar view showing the relation of the parts during expulsion of the plastic material, and Fig. 9 is a detail transverse section of the ribbon of plastic material.

My invention is applicable to collapsible tubes or containers of the usual cylindrical form, made of lead, tin, aluminum, or other soft metal or alloy. In the preferred structure, illustrated in the drawing, the cylindrical body 10 of the tube has an integral permanently closed end 11 of substantially the same thickness as the cylindrical wall, said end being provided with an integral transverse ridge or head 12, adapted to serve as a core when rolling the tube from said closed end to produce pressure upon, and expel, the plastic contents. The opposite or open end of the tube is formed originally by the terminal portion of the cylindrical wall of the body 10, and after the tube is filled, by the introduction of the plastic material through said open end, the opposite sides of the tube at said open end are pressed into contact with each other, and the closing device is clamped upon the contacting flattened terminal portions 14. The closing device includes a body portion 15 consisting of a rectangular piece of stiff sheet-metal bent along its longitudinal center into a narrow U-shape or trough formation. In one side of the body portion 15, intermediate its ends, is a rectangular opening 16, which is spaced from the adjacent longitudinal edge of the body, and extends to the longitudinal center along which the body is bent. A bar portion 17, between the longitudinal edge of the body and said opening 16, is swaged outward or forwardly from the plane of the end portions of the front side of the body, for a purpose which will presently appear. Adjacent to the ends of the opening 16, small tongues 18 are cut and swaged inwardly, for engagement with the end portions of the closing spring. The latter is formed integrally of spring wire, and comprises a bowed central portion 19, straight longitudinally alined portions 20 extending outwardly from the ends of the central bowed portion, and slightly hooked end portions 21 extending forwardly from the ends of the longitudinal portions 20, said portions 21 being normally in a plane which is angularly related to the plane of the central bowed portion 19, as best shown in Figs. 4 and 5. The end portions 21 of the spring are engaged with the tongues 18 of the body, by which the spring is held in place therein prior to the clamping of the same upon the flattened end of the tube 10, the arrangement being such that the central bowed portion of the spring lies across the opening 16, being inclined toward the rear side of the U-body, and the longitudinal portions 20 lie within the U-body adjacent to the ends of the bar portion 17.

The closing spring and the U-body or clip being in their assembled relation shown in Fig. 4, with the spring retained in place by the engagement of the ends thereof with the tongues 18, the contacting flattened terminal portions 14 of the tube are inserted in the clip so as to lie against the rear or imperforate side thereof, and the sides of the clip are then forcibly pressed inwardly to firmly clamp the same upon said terminal portions 14. It is essential that the body 15 of the clip be of stiff and non-resilient material, so that when it is pressed into its flattened clamping formation upon the end of the tube, it will remain permanently affixed thereto and not be subject to displacement by pressure from the contents of the tube. The retention of the clip upon the tube is assisted by partial embedding of the tongues 18 and the end portions of the closing spring into the soft metal of the flattened tube-walls. The operation of clamping the device onto the tube, forces the bowed central portion 19 of the spring into a plane substantially the same as that of the end portions 21, and causes said bowed portion 19 to press firmly against the front side of the tube-wall 14 which is exposed at the opening 16. The pressing of the bowed portion 19 into

the plane of the end portions 21, causes a torsional stress in the longitudinal portions 20 of the spring, said portions 20 comprising, substantially, an axis about which the bowed intermediate portion 19 swings pivotally upon the application thereto of a sufficient force to produce torsion of the portions 20.

After the clamping of the clip upon the flattened end of the tube, as described, a moderate pressure upon any portion of the tube causes the plastic material therein to flow into the space beneath the bar portion 17 of the clip, raising the tube-wall into contact therewith as shown in Fig. 7, but at the curved line along which the spring portion 19 is engaged with said tube-wall the flow of the plastic material is stopped unless the plastic pressure is great enough to lift the bowed portion of the spring, by overcoming the normal pressure thereof against the yieldable tube-wall. Upon the application of sufficient pressure, however, the spring and the adjoining wall of the tube yield and are lifted to allow the extrusion of the plastic material P as shown in Fig. 8. Because of the bowed formation of the spring, and its tilting movement in yielding to the plastic pressure exerted upon the inside of the tube-wall, the opening formed by the lifting of the tube-wall is curved at the upper side, which is defined by the yielding wall and spring, and is flat at the lower side which is defined by the tube-wall which is supported by the imperforate bottom or rear side of the clip. The plastic material P is thus delivered from the tube in a strip or ribbon of the sectional form shown in Fig. 9, having thin pliable edge portions adapted to sink into and cling to a brush or the like on which the ribbon of material may be received. By the forward or outward displacement of the bar portion 17 from the plane of the end portions of the front side of clip, the plastic material is allowed to flow freely thereunder in sufficient volume to form the strip or ribbon, but said bar portion 17 serves to limit the depth or thickness of the plastic mass which approaches the line of contact of the spring with the yielding tube-wall, and prevents excessive bulging of said wall, so that, upon discontinuing the pressure for extruding the plastic material, the spring pressure may restore the soft-metal wall to its normal flat or closed formation, with greater ease and certainty than if excessive bulging thereof were permitted.

Now, having described my invention, what I claim and desire to secure by Letters Patent is:

1. The combination with a collapsible tube having terminal portions of its side-walls flattened into contacting relation, of a clip having a rigid body clamped about said flattened terminal portions, said body having an opening therein exposing one of said flattened terminal wall-portions, and a resilient member having end portions held by said clip and an intermediate portion extending across said opening and pressing yieldingly upon said exposed wall-portion to normally hold the same in flat formation and to return the same to contacting relation with the opposite wall-portion after distortion thereof by pressure from the contents of the tube.

2. A dispensing closure for collapsible tubes, comprising a U-shaped metal clip adapted to clamp about flattened terminal wall-portions of a tube, said clip having in one side thereof an opening exposing a part of one side of the clamped terminal tube-wall portions, and a spring having an intermediate portion extending across said opening and having end portions rigidly held by said clip, said spring arranged to press upon the exposed tube-wall to normally hold the same in contacting relation with the opposite wall of the tube and to return the same to contacting relation after displacement thereof by pressure from within the tube.

3. The combination with a tubular container of pliable material having terminal portions of its side-walls flattened into contacting relation, of a dispensing closure comprising a rigid clip clamped upon said flattened terminal portions and having in one side thereof an opening exposing one of said flattened wall-portions, a spring having end portions held fixedly within said clip and a yieldable intermediate portion extending across said opening and pressing upon said exposed wall-portion to normally retain the same in contact with the opposite wall-portion, and a bar portion on said clip extending between said opening and the adjacent body-portion of the tube and limiting outward displacement of the adjacent tube-wall.

4. The combination with a tubular container of pliable material having terminal portions of its side-walls flattened into contacting relation; of a U-shaped metal clip having a rigid body clamped upon said flattened terminal portions, said body having in one side thereof an opening exposing a part of one of said side-walls; a spring having a bowed intermediate portion extending across said opening, aligned longitudinal portions extending oppositely from said intermediate portion, and end portions extending transversely of said longitudinal portions and clamped fixedly within said clip; the longitudinal spring-portions being torsionally stressed whereby to press the bowed intermediate spring-portion yieldingly upon the part of the side-wall exposed at said opening, and said clip-body having a bar portion spaced outwardly from the tube side-wall adjoining said opening, said bar portion limiting outward displacement of said tube-wall.

5. The combination with a collapsible tube having terminal portions of its side-walls flattened into contacting relation, of a clamping member disposed about said side-wall portions and normally retaining the same in contact with each other, said clamping member including a resilient element pressing yieldingly upon a part of one side-wall and having a curved line of contact therewith, said resilient element being movable substantially about an axis passing through the ends of said curved line of contact, whereby upon outward movement of said element the intermediate part of the line of contact has a greater displacement than the terminal portions thereof.

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