Dec. 28, 1948. J. G. CARLINE 2,457,345

DEVICE FOR DISPENSING ARTICLES

Filed June 20, 1945

Fig. 1.

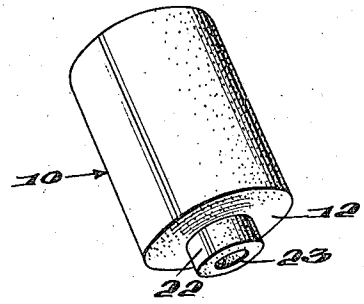


Fig. 2.

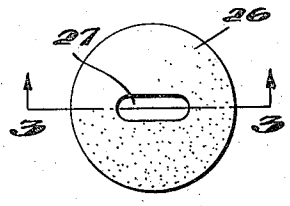


Fig. 3.

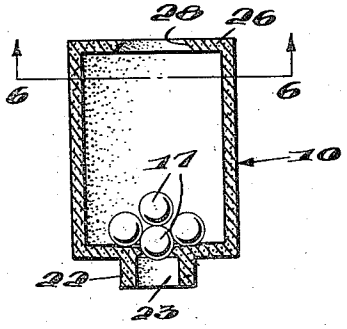


Fig. 4.

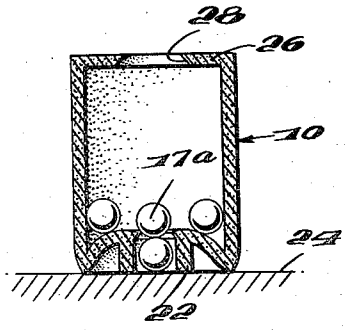


Fig. 5.

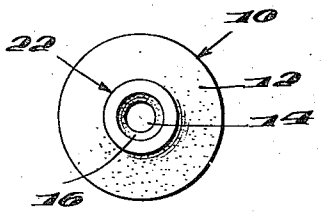
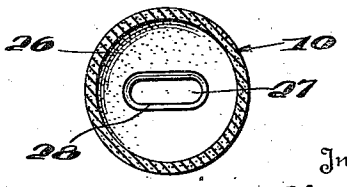


Fig. 6.



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DEVICE FOR DISPENSING ARTICLES

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7 Claims. (Cl. 206—56)

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The present invention relates to a device for dispensing individual articles and more particularly pertains to the structural arrangement providing a discharge opening for controlling the delivery of articles from the dispensing device.

An object of the invention is to provide a dispensing device of relatively simple construction which is rugged and reliable in operation to deliver one or more articles from the device without the necessity of employing any mechanical moving parts for controlling the delivery articles through a discharge opening in the dispensing device.

Another object of the invention resides in providing a resilient diaphragm in a dispensing device with an opening in the diaphragm normally of such a small area as to prevent articles from passing therethrough with the opening adapted to be dilated upon deformation of the resilient member to permit the passage of an article therethrough.

A more specific object of the invention is to provide a dispensing container with a resilient diaphragm shaped bottom wall with an opening therein of such dimensions as to normally obstruct the passage of an article therethrough but adapted to be dilated upon distortion of the diaphragm out of its normal plane whereby the opening is sufficiently dilated to permit an article to be discharged through the opening.

Other objects and features of the invention will be more apparent as the present disclosure proceeds and upon consideration of the accompanying drawing and the following detailed description wherein an exemplary embodiment of the invention is disclosed.

In the drawing:

Fig. 1 is a perspective view of a dispensing device embodying the invention.

Fig. 2 is a plan view showing the upper end of the device.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2 and illustrating the normal position of the diaphragm which provides the bottom wall of the device.

Fig. 4 is a similar sectional view illustrating the manner in which the opening in the diaphragm is dilated upon distortion of the bottom wall.

Fig. 5 is an end view illustrating the discharge opening in the normal position of the diaphragm.

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 3.

The invention relates to a dispensing device which may be employed for delivering individual articles therefrom such as generally spherical

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shaped members, balls, pellets, shot, capsules or the like and embodies a basically different structural arrangement for controlling the delivery of one or more articles through a discharge opening and provides a device devoid of any mechanical moving parts for controlling the discharge of articles. A dispensing device exhibiting the invention comprises a container including a bottom wall formed like a diaphragm and of resilient material. The resilient diaphragm or bottom wall of the container is normally arranged in one plane and is relatively thin so as to be capable of distortion axially of the container and out of its normal plane. The diaphragm is provided with an opening which is normally and in the undistorted state of the diaphragm of such small area as to obstruct the movement of an article through the opening. The diaphragm may be formed of rubber, synthetic rubber, or any suitable resilient material. That portion of the diaphragm surrounding the opening is formed as a relatively thin annular lip so that upon distortion of the diaphragm the resilient material is placed under tension at all annular points radially of the opening whereby the lip is drawn radially outward at all points surrounding the opening and the opening is dilated sufficiently for permitting an article to pass therethrough.

In the illustrative embodiment shown in the drawing a container is represented at 10 which may be cylindrical shaped and formed of any suitable material. The shape and the dimensions of the container 10 are not critical and this part of the receptacle may also be of any cross sectional shape. An essential feature of the invention pertains to the bottom wall 12 of the container which is formed of relatively thin resilient material such as rubber or an equivalent material providing a diaphragm member substantially closing the lower end of the container 10. In an exemplary embodiment of the invention the container 10 and the bottom wall 12 are both formed of rubber and integrally associated with each other. The bottom member 12 is sufficiently thin to be flexible and is provided with an opening 14 which may be arranged in alignment with the axis of the container 10. The resilient diaphragm 12 adjacent the opening 14 is formed as a relatively thin annular lip 16 which defines the area of the opening. The inner face of the bottom member slopes slightly towards the opening 14 from the perimeter of the container so that an article therein will roll to a position immediately above the discharge opening. The opening 14 is of such dimension as to normally obstruct the

passage of an article, such as a ball 17, through the opening.

A characteristic feature of the invention is that the opening 14 is dilated upon distortion of the resilient bottom wall 12, and when the diaphragm is moved out of its normal plane or position. This dilation of the opening takes place when the diaphragm is distorted axially of the container 10 whereby that portion of the diaphragm surrounding the opening 14 is tensioned radially outward at all annular points to draw all annular portions of the lip 16 outwardly whereby the opening becomes dilated sufficiently for permitting a ball 17 to pass therethrough. This distorted condition of the diaphragm 12 is illustrated in Fig. 4 and it will be observed that the lip 16 is retracted at all annular points which provides a dilated opening for the passage of an article therethrough.

Another feature of the invention pertains to means for distorting the diaphragm and which also serves to control the number of articles that are delivered upon distortion of the bottom wall. Any suitable means may be provided for applying pressure to the diaphragm around the opening 14 and the exemplary arrangement shown in the drawing comprises a tubular member 22 which has a central opening 23 slightly larger than the cross sectional dimensions of an article to be dispensed from the container 10. The tubular member 22 is arranged adjacent the outer face of the diaphragm 12 and may be formed integral with the diaphragm as shown in the drawing. The tubular member 22 is relatively rigid compared to the flexibility of the diaphragm 12 and may be formed of any suitable material appropriately secured to the diaphragm.

Thus when pressure is applied to the lower end of the tubular member 22 or when it engages some relatively immovable surface 24 as represented in Fig. 4 and the container 10 is moved downwardly, the diaphragm 12 will be distorted out of its normal plane as will be appreciated upon consideration of Fig. 4 with regard to the normal position of the diaphragm as shown in Fig. 3. This distortion or arching of the diaphragm will cause dilation of the opening 14 as hereinbefore explained, and one of the articles such as a ball 17 will escape through the dilated opening.

When it is desired to deliver a single article or ball 17 from the container the tubular member 22 is formed of a dimension greater than the maximum height of the article to be dispensed, or greater than the diameter of one of the balls 17 which are all of substantially the same diameter. The length of the tubular member 22 when but one article is to be dispensed is however shorter than one and one-half diameters of the balls. Such a structural arrangement provides that one ball only will pass through the opening 14 and will be supported on the surface 24 within the tubular member 22 and which will prevent the next succeeding ball from passing through the opening 14. Thus when the diaphragm 12 is restored to its normal position the opening 14 will contract and prevent the escape of the ball 17*a*.

The container 10 may be closed at its upper end in any suitable manner and in the illustrative embodiment the top is provided with a rubber cover 26, but any type of lid may be attached to the top of the container. In the arrangement shown in the drawings a slot 27 is provided in the cover 26 through which the articles to be dispensed may be introduced into the container 10. The slot 27 is narrower in width than the overall dimensions of the articles 17, but these articles may be readily introduced into the container through the slot 27 by distortion of the resilient cover 26. The boundary edge of the slot 27 preferably tapers as shown at 28 in the drawing so that a ball when moved into the slot 27 will be urged into the receptable 10 upon contraction of the resilient cover 26.

While the invention has been described with reference to specific structural details, it is apparent that changes may be made in the structure of the device without departing from the invention which pertains to the shape and arrangement of the resilient diaphragm 12 having the opening 14 therein and means for applying pressure to the diaphragm so as to distort it out of its normal plane and dilate the opening for the discharge of an article from the container. The shape of the opening 14 may be varied and it is also possible to alter the length of the tubular member 22 so as provide for the delivery of more than one article from the dispensing device. Such changes may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. In a device for dispensing individual spherical shaped articles of substantially uniform diameter, a resilient diaphragm forming the bottom wall for the device and normally arranged in one plane and having an opening therein of smaller diameter than the diameter of any one of said spherical articles, and a tubular member surrounding the opening for moving the resilient diaphragm outside said plane and thereby enlarge the diameter of the opening for permitting an article to pass therethrough.

2. In a device for dispensing individual articles, a container including a resilient diaphragm forming the bottom wall of the container, said diaphragm having an opening therein of a diameter smaller than the diameter of a ball to be dispensed from the container, a tubular member surrounding the opening adjacent the outer face of the diaphragm for moving the bottom wall axially of the container to dilate the opening, and the length of said tubular member being greater than the diameter of the ball and of less length than one and one-half diameters of a ball.

3. A dispensing device comprising a holder having a chamber for receiving a plurality of articles, the holder having an end wall with a dilatable opening extending therethrough of a normal diameter less than the diameter of the articles aforesaid, and a tube carried by and projecting from the end wall coaxial thereof, the side wall of the chamber being movable in an axial direction relative to the tube for dilating the opening through the end wall of the holder for permitting the passage of one of the articles through the opening.

4. A dispensing device as recited in claim 3 in which the tube in diameter is greater than the normal diameter of the opening, and in length is greater than said normal diameter but less than one and a half times the diameter of the opening.

5. An article holding and dispensing device providing a chamber for containing a plurality of rigid articles, said device being adapted to individually dispense the articles, and comprising a side wall, a bottom wall, and a tubular member projecting from the bottom wall axially

thereof, the said member and the side wall being rigid relative to the bottom wall, and the latter having an opening axially therethrough which in the normal position of the bottom wall is of less diameter than the articles aforesaid, said bottom wall permitting the relative movement of the tube and side wall in an axial direction for dilating the opening aforesaid for permitting the passage therethrough of an individual article, and the tube being of sufficient length to receive and house the individual articles.

6. A device for holding and dispensing rigid articles comprising a chamber having a dilatable orifice normally smaller than the cross-sectional area of the articles to be dispensed, means for dilating said orifice to permit the passage therethrough of said articles, said dilating means including a tube contiguous to the exterior of said orifice and smaller than the chamber for holding a predetermined quantity of said articles.

7. A device for holding and dispensing rigid articles comprising a chamber having a dilatable orifice normally smaller than the cross-sectional area of the articles to be dispensed, and means for directing the articles toward said orifice under the influence of gravity, means for dilating said orifice to permit the passage therethrough of said articles, said dilating means including a tube contiguous to the exterior of said orifice and smaller than the chamber for housing the articles discharged from the chamber through the dilated orifice.

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