

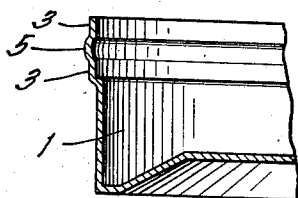
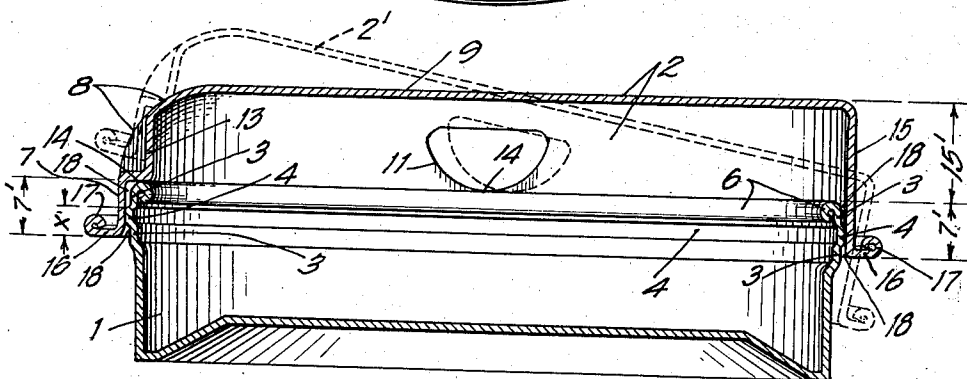
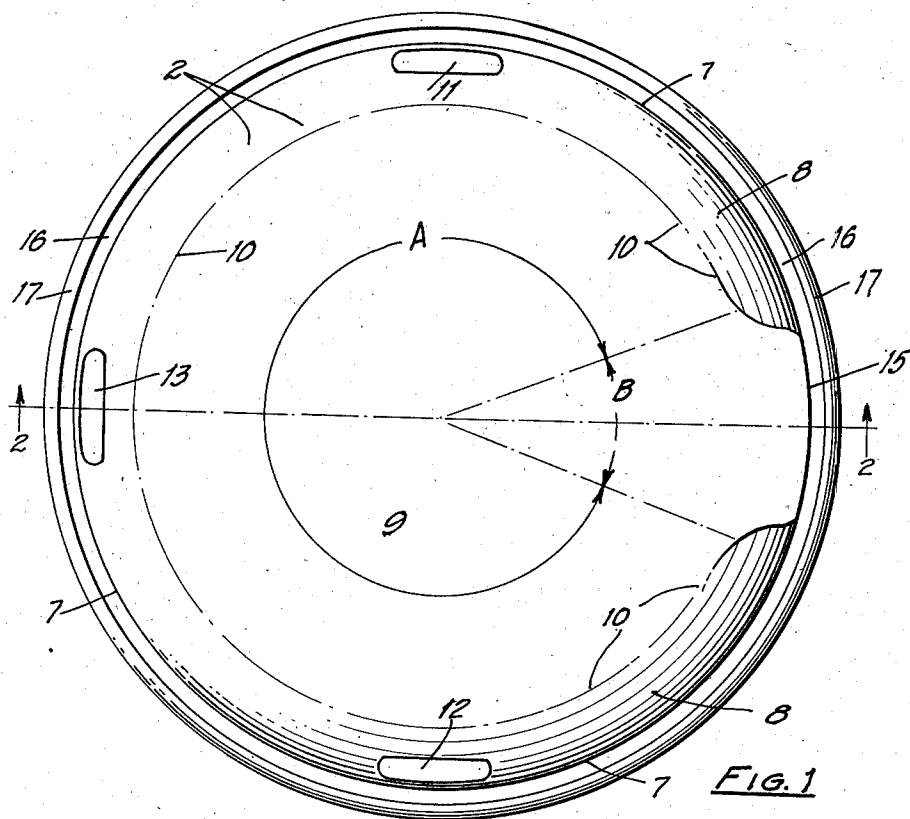
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BOX

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2,379,679

BOX

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2 Claims. (Cl. 220-43)

My invention relates to boxes and particularly to boxes made from sheet metal such as tin plate, black iron and the like and which are used as containers for shoe polish, waxes, ointments, etc. More particularly it relates to improvements in air tight boxes of the type disclosed in my copending application Serial No. 431,361.

Boxes which are used as containers for shoe polish and other compositions having volatile constituents must be so designed as to maintain an air tight fit between the cover and the body of the container. The fact that such an air tight fit is required makes it very difficult to remove the cover from a box of the ordinary type, and the boxes now extensively used for shoe polish are for the most part so designed that the cover can be pried off with a coin or by means of a lever which is pivotally secured to the box. Obviously, a box from which the cover can be easily removed merely by pressure exerted on a certain zone thereof either by the foot or the hand, and which at the same time is substantially air tight and will remain air tight irrespective of the number of times the cover is removed and replaced would represent a substantial advance in the art.

In my copending application aforesaid I have disclosed a box in which the container portion is provided around the open end thereof with an expanded zone of rather substantial depth the outside surface of which, in cross section, is curvilinear and preferably circular. In other words, this expanded portion approximates the equatorial zone of a sphere, and the cover, or that portion thereof which forms the contact with this expanded portion, is cylindrical and tangent thereto when the box is closed. The fact that the assembly may be considered essentially as a cylinder tangent to a portion of a sphere makes it clear that the cover may be pressed down on one side and substantially raised on the other and still remain tangent to the expanded portion of the container. Thus, in a box which is intended to be opened by a cover-tilting pressure exerted on one edge thereof, considerable relative movement of the cover and box can be effected in the zone of pressure and in a zone 180° therefrom while the cylinder still remains tangent to the sphere. In other words pressure on the side of the cover does not immediately release it from the container. This is not a very serious disadvantage but it would be desirable to have a box of such design that pressure exerted at one point along the top edge of the cover will cause the opposite side thereof substantially immediately to pop up and thus render the cover immedi-

ately free from the container. However there is another objection which has been discovered in the practical manufacture of boxes of this type in that it is difficult or impossible to roll out an expanded portion of this shape without producing slight wavelike crests and hollows around the entire periphery of the expanded portion.

There is a still further difficulty which is inherent in the manufacture of all metal boxes which are drawn by means of dies and which is due to slight variations in the thickness of the sheet metal which is supplied to the box manufacturer. It is not uncommon to produce from the same set of dies boxes and covers which vary considerably in the way in which they fit together. Some covers are loose and others are tight. As containers for compositions formed wholly of non-volatile constituents this is not a very serious objection but in the case of containers for shoe polish and the like a box on which the cover does not form an air tight fit is substantially worthless.

A number of designs has been proposed for easy opening boxes of the general type disclosed herein and in my copending application aforesaid but all of them have some inherent defect which makes them difficult to open, or in which an air tight fit between the cover and box is impossible to attain or, if initially attained, is impossible to maintain after the box has been opened one or more times. The metal from which such boxes are manufactured is of relatively thin gauge, usually from 0.010" to 0.011" in thickness, and boxes drawn therefrom according to heretofore proposed designs and particularly the covers thereof are easily distorted. Since, in any case, a rather substantial pressure is required to dislodge the cover, most cover designs flex or bend so that after they have once been removed from the box it is impossible thereafter for the cover to form an air tight fit with the container.

The general object of my invention is to provide an easy-opening container of such design that the foregoing defects are eliminated. More specifically, one of the objects of my invention is to provide an easy-opening metal box of such design that it will be practically air tight and will remain air tight substantially irrespective of the number of times it is opened and closed. Another object is to provide a box of such design that when pressure is applied to a certain edge zone of the cover the opposite edge will abruptly pop up without any drag between the cover and the contact. A further object is to provide a box of such design that variations in gauge of the metal which

ordinarily produce loose and tight fitting covers may be readily compensated for so that all covers fit uniformly tight.

With these objects in view my invention includes the novel elements and combinations and arrangements thereof described below and illustrated in the accompanying drawing in which—

Fig. 1 is a plan view of my box;

Fig. 2 is a section of Fig. 1 in the plane 2—2 in which the thickness of the metal has been exaggerated; and

Fig. 3 is a fragmentary section of a container portion, similar to a portion of the section shown in Fig. 2, but illustrating a slight modification in design.

Referring to the drawing, my box comprises a round or generally cylindrical portion which is open at the top, and a cover 2. Around the top of the container portion and adjacent the open end thereof it has a peripherally expanded portion 3 which projects outwardly and appreciable distance beyond the peripheral zones of the container immediately therebelow. Within, and outwardly projecting beyond, the aforesaid expanded peripheral portion is a comparatively narrow peripheral bead 4, the outward surface of which, in cross section, may be flat, as shown in Fig. 2, or rounded, as shown at 5 in Fig. 3. This bead forms a substantially air tight contact with the cover 2. In order to stiffen the upper edge of the container where such stiffening is necessary due to the thin gauge metal it may be curled as shown at 6. Where such stiffening is not necessary the curl may be omitted, as shown in Fig. 3.

The skirt portion 7 of the cover 2 is substantially cylindrical throughout the vertical distance 7' and throughout the major portion A of its periphery, and has an inside diameter adapting it to fit substantially tangentially over the bead 4 and substantially in air tight contact therewith. Above the skirt portion 7 the cover curves inwardly, as shown at 8, from the cylindrical skirt portion 7 to merge with the flat top portion 9 in about the zone 10. The cover is provided with diametrically disposed struck-in portions 11 and 12 which are designed to rest on the upper edge of the container and thus to limit the distance which the cover can be pressed downwardly over the bead 4. A third struck-in portion 13 which may be similar to the portions 11 and 12 is preferably provided halfway between the portions 11 and 12 in order to facilitate an even seating of the cover on the container. On the side opposite the struck-in portion 13 and throughout a minor portion of its periphery between the struck-in portions 11 and 12 the cover is substantially cylindrical from top to bottom as shown at 15. In other words, here, the cover is cylindrical throughout the distance 7'+15' (see Fig. 2).

It is very important that the cover be so designed as to resist distortion to the highest possible degree, especially any tendency to flex or bend when pressure is applied to the edge of the flat portion of the cover within the zone B. This resistance is partially attained by rounding the cover as shown at 8 between the cylindrical skirt portion and the flat top 9, and partially by providing the outstanding peripheral flange 16 at the bottom of the skirt, the free edge of which is rolled to provide the curl 17.

By reference to Fig. 2, it will be noted that the cover contacts the container portion only around the peripheral bead 4 and at the points where the struck-in portions 11, 12 and 13 rest upon the upper rim thereof. In other words annular spaces 18 of appreciable width are provided be-

tween the cover and the container both above and below the bead 4. By this construction it will be apparent that when downward pressure is applied at the edge of the cover within the zone B the cover will move downwardly in the zone of pressure, and the struck-in portions 11 and 12 will function as trunnions about which the cover will be tilted or rocked. Since the bead 4 is comparatively narrow the left hand side of the cover, as viewed in Fig. 2, need only move upwardly through the distance X' whereupon it will be entirely free from the container and pop up into the position 2' so that it may be readily lifted off.

In the construction of the box the container portion is first drawn with the expanded portion 3 therein about the open end in the form of a continuous cylinder. Thereafter, a zone of the expanded surface is rolled out to form the peripheral bead. Since the outside diameter of the peripheral bead determines how tightly the cover will fit on the container portion and it is a simple matter to adjust the beading rollers to produce any reasonable variation in the outside diameter of the bead 4, variations in metal gauge may be compensated for by merely making the necessary adjustments to the rollers. Thus, when variations in metal gauge are encountered, the problem of producing boxes with uniformly tight fitting covers is greatly simplified.

From the foregoing it will be apparent that by using a bead, such as shown at 4 or 5, which projects outwardly from the expanded top portion of the container, the contact with the cover may be made of any desirable width or depth and positioned anywhere within the limits of the expanded portion. However, my experiments have indicated that the bead should be comparatively narrow, at least when a flat bead is employed, and it should be positioned so that the contact is formed fairly near the bottom of the cover. In other words, since the ease with which the box may be opened depends on the distance X' this distance is preferably kept comparatively small.

There is another very decided advantage in using a bead of this type and spacing it somewhat below the upper edge of the container. By this arrangement the cover is very readily seated squarely on the contact because the expanded portion of the container, above the bead, is only slightly smaller than the inside of the cover it serves as a centering means for the cover which can pass downwardly thereover until it contacts the bead.

What I claim is:

1. A metal box comprising a round container portion open at one end forming the top thereof and provided about said end with a stiffening curl, an outwardly-expanded peripheral portion adjacent and extending around said open end, a narrow, continuous, peripheral bead intermediate the top and bottom of and outwardly projecting from said peripheral portion, and a cover for said container comprising a substantially cylindrical skirt portion laterally surrounding said bead and in substantially air-tight, tangential contact therewith; the bottom of said skirt portion being provided with an outstanding, peripheral, stiffening flange having a reinforcing curl about its free edge; diametrically-disposed, struck-in portions in said cover adapted to rest on the upper edge of said container when said box is tightly closed and thus to limit the distance which said cover can be pressed downwardly over said peripheral bead in the zones

thereof adjacent said struck-in portions, and said cover throughout a portion only of its periphery between said struck-in portions and on one side thereof being substantially cylindrical from top to bottom; whereby downward pressure applied to said cover at the edge of said last mentioned cylindrical portion will move said cover downwardly in the zone of pressure and effect a tilting and loosening of said cover to facilitate the removal thereof from said box.

2. A metal box comprising a round container portion open at one end forming the top thereof; the periphery of said container adjacent the open end thereof being outwardly-expanded and projecting substantially beyond the adjacent peripheral portions of said container therebelow; a comparatively narrow, continuous, peripheral bead within and outwardly projecting from said expanded portion, and a cover for said container comprising a cylindrical skirt portion extending downwardly over and around said peripheral bead and forming a substantially tangential, air-tight

5 contact therewith; said cover curving inwardly and upwardly throughout the major portion of the periphery thereof from said cylindrical skirt portion to merge with a flat top of said cover, and being substantially cylindrical from top to bottom throughout the remaining minor portion of the periphery thereof; and diametrically disposed struck-in portions in said cover symmetrically disposed with respect to said minor peripheral portion and adapted to rest on the upper edge of said container when said box is tightly closed and thus to limit the distance which said cover can be pressed downwardly over said peripheral bead on said container in the zones thereof adjacent said struck-in portions; whereby downward pressure applied on said cover at the edge of said minor portion of the periphery thereof will move said cover downwardly in the zone of pressure and effect a tilting of said cover on said struck-in portions as trunnions to loosen and facilitate the removal of said cover from said container.

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