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R. NYDEN ET AL

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END STRUCTURE FOR POWDER CANS

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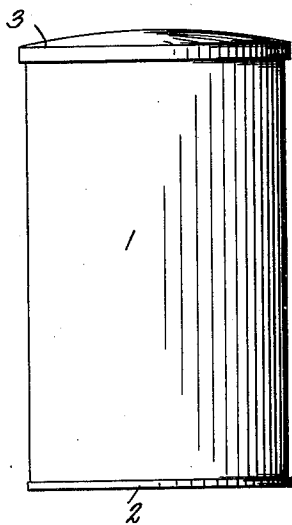


Fig. 1.

Fig. 2.

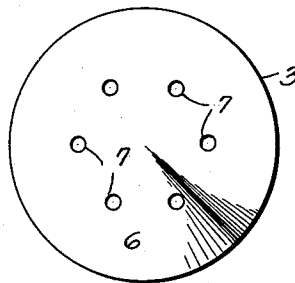


Fig. 3.

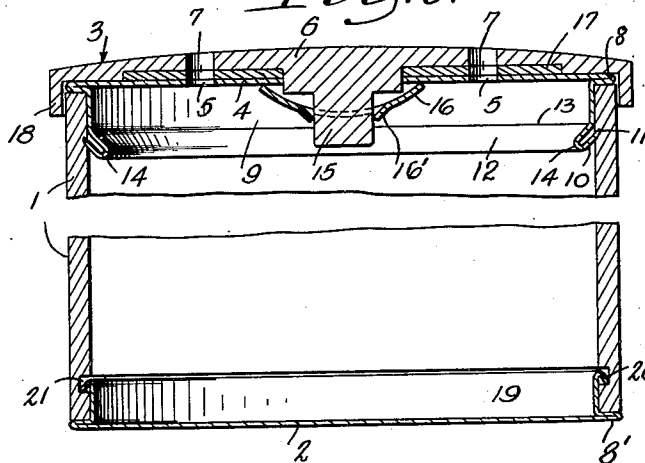


Fig. 5.

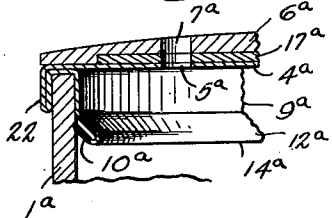


Fig. 4.

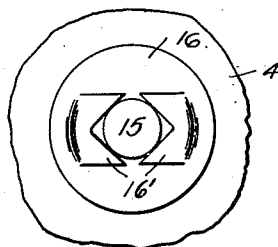


Fig. 6.

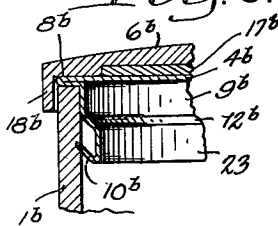
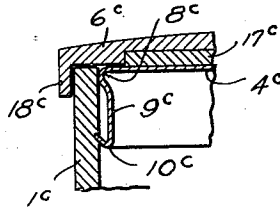


Fig. 7.



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END STRUCTURE FOR POWDER CANS

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This invention relates to improvements in containers and especially to containers for powder or other comminuted materials, and principally constructed of paper, fiberboard, cardboard, pasteboard, plastic, and similar relatively light and inexpensive materials, and having end closure structures of metal or similar relatively hard and rigid material.

It is a general object of the invention to provide for containers of the class mentioned, an improved end closure structure especially constructed and arranged for making tight anti-sift joints with the body part of the container, and is firmly held in position to avoid accidental separation from the body part, or to become loose or leaky during handling thereof as in transportation, and additionally providing an improved end structure that can be quickly and easily inserted in operative closing position without the use of special tools or apparatus.

Another object is to provide for containers of the class mentioned, an improved end closure structure of sheet metal or like material and having a depending or skirt flange fitting into the end of the paper body of the container, and having an improved arrangement of a hook flange or bead inclined so as to engage and be embedded or bite into the adjacent surface of the container body so as to hold the parts firmly and positively in assembled relation, to avoid sifting of the container contents, and to avoid accidental separation or loosening of the parts during handling of the container, as in transit.

According to another feature of improvement of the invention, the retaining hook flange of the end structure of the container is especially constructed and arranged so as to impart to it additional flexibility to enable it to engage firmly in holding relation with the container wall, and to constantly maintain its holding engagement so as to avoid accidental loosening whereby a secure attachment is provided over long periods of time and during continued handling of the containers, as for example, when packed in cartons during shipment.

Another object of the invention is to provide for containers of the class mentioned, an improved metallic end structure that is adapted for use either at the top or bottom of a powder can or the like.

Still another object of the invention is to provide for containers of the class mentioned, an improved end structure having an arrangement of depending or skirt flanges for engaging both the inner and outer surfaces of the tubular container

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walls, and having improved attaching means whereby the end structure can be applied and attached in operative position without the use of special crimping tools or apparatus.

Other objects and advantages of the invention will be in part pointed out in the following detailed disclosure of certain illustrative but preferred embodiments of the invention, and will be in part obvious as the disclosure proceeds.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a more comprehensive disclosure of the nature, objects and advantages of the invention, reference is had to the following detailed description of the illustrative embodiments, and to the accompanying drawings in which:

Fig. 1 is a side elevation of a tubular powder can embodying the invention;

Fig. 2 is a top plan view of the same;

Fig. 3 is an enlarged central vertical section of the powder can shown in Figs. 1 and 2;

Fig. 4 is a fragmentary bottom plan of the central portion of the end closure structure shown in Fig. 3;

Fig. 5 is a fragmentary enlarged sectional view similar to that of Fig. 3, but disclosing a modified structure;

Fig. 6 is a fragmentary sectional view similar to Figs. 3 and 5 but showing a further modified embodiment, and

Fig. 7 is a sectional view similar to that of Fig. 3 disclosing a still further modified embodiment.

Referring to the drawing for a detailed description of the illustrative embodiments there shown, and first to the embodiment of Figs. 1, 2, 3 and 4, a can or container is shown having a body or body part 1 ordinarily tubular in form, as shown, and constructed of paper, cardboard, fiberboard, plastic, or like relatively light material, and having a bottom end closure 2 and a top end closure 3. The body part 1 may assume other cross-sectional shapes such, for example, as square, triangular, rectangular, polygonal, etc., and the top end closure 3 may embody a dispensing or sifter closure structure which is described below.

As best shown in detail in Fig. 3, the top end closure 3 embodies a disc or plate 4 preferably constructed of metal or similar material, tinned or otherwise coated to prevent rust, corrosion, etc., and constructed so as to be engaged in telescoping relation with the upper end of the body part 1

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and having attaching means to hold it securely in assembled relation and to provide a tight sift-proof seal with the body of the container. In cases where the top is constructed for dispensing or sifting the container contents, the closure plate 4 may be provided with one or more dispensing openings 5 and with an outer cap or finishing member 6 preferably of ornamental plastic material or of enameled metal or the like and provided with dispensing openings 7 adapted to align with the openings 5 or to be moved out of alignment with the same in tight sealing position upon movement of the cap 6.

The closure plate 4 as shown, is preferably folded or doubled upon itself at the marginal portion thereof to form a marginal reinforcing flange 8 which may be positioned in overlapping relation with the upper end of the wall 1, as shown in Fig. 3, or as shown in Fig. 7 this reinforcing flange may terminate flush with the inner surface of the container wall. The metallic plate at the inner extremity of the doubled flange 8 is bent or deflected downwardly to form the depending skirt flange 9 positioned and proportioned to engage closely with the inner surface of the wall 1. This skirt flange is formed with a retaining hook flange or bead 10 ordinarily positioned adjacent its lower marginal portion, as shown, and having an outer edge 11 which may be formed by the severing of the metal so as to impart to it a sharpness enabling it to be embedded or to penetrate into the inner surface of the wall 1. In the preferred embodiment this hook flange is best provided by deflecting or bending the skirt flange inwardly to form a flange part 12 bent inwardly from alignment with the skirt flange 8 substantially along the horizontal line 13, and extending continuously entirely around the skirt flange at the upper opening of the container body 1. This flange part 12 is bent or deflected outwardly as at 14 to form the hook flange 10 which in this embodiment is close to and preferably spaced slightly from the flange part 12. The hook flange as shown is thus inclined outwardly toward the closure plate 4 and toward the adjacent inner surface of the wall of the body part 1. This hook flange structure imparts an added flexibility to the attaching structure enabling the latter to maintain its attaching position substantially constantly over long periods of time as, for example, during handling when a plurality of the containers are packed in a carton during shipment so as to tend to loosen the attachment slightly, perhaps due to slight expansion of the container walls, or to other causes. This flexible structure is more fully described below.

In the illustrative embodiment of Figs. 1, 2 and 3, the plastic cap and dispensing controlling member 6 is rotatably secured to the closure plate or disc 4 by means of an integral extension 15 extending through a central opening in the closure plate. The attaching extension 15 may be secured in position by any appropriate means in so far as the present invention is concerned, and as shown, a hard steel dished attaching washer 16 is used for this purpose having pointed tongues 16' adapted to engage and to be embedded in the attaching extension and having its rim engaging with the inner surface of the closure plate 4. A sealing washer 17 is interposed between the outer surface of the closure plate 4 and the inner surface of the cap 6 which is provided with a recess for receiving the washer so as to make a tight sealing joint for the dispensing openings when

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the cap is turned to non-dispensing position. The sealing washer may be constructed of yielding material such, for example, as fiberboard, paperboard, and the like, and is provided with openings adapted to align with the dispensing openings in the closure plate 4 and in the cap 6.

In some instances, as particularly shown in Fig. 2, it is desirable to provide a depending or skirt flange 18 at the outer edge or periphery of the cap 6. This outside skirt flange 18 extends downwardly sufficiently so as to engage with the outer surface of the container wall and to brace and rigidify the wall against undue outward deflection, thus aiding in maintaining such a firm connection of the hook flange 10 with the container wall as to maintain a tight permanent connection.

As shown in Fig. 3, the bottom 2 of the container may be constructed of metal similar to that of the closure plate 4, and having other structural features similar to the closure plate 4 for attaching the bottom in position at the lower end of the wall of the body part 1. The bottom closure member 2 may be provided with the double fold 8' similar to the fold 8 of the top plate 4 or it may be constructed similar to the disclosure of Fig. 7. This bottom plate 2 also has a skirt flange 19 similar to the flange 9 of the top closure plate, and sized and proportioned to telescope with the lower end of the container walls in a similar manner. This skirt flange 19 also is provided with an outwardly turned hook flange or bead 20 adapted to engage or be embedded in the inner surface of the container walls. In the embodiment shown in Fig. 3, the inner surface of the wall of the body part 1 has a groove 21 extending entirely around said inner surface for receiving the hook flange 20, but ordinarily this groove may be omitted so that the edge of the hook flange is embedded in the container wall as disclosed in the embodiment of Fig. 7. Also, it will be understood that the bottom plate may be constructed substantially similar to the top closure plate 4 with the dispensing cap and associated dispensing parts omitted.

From the foregoing detailed description it will be seen that the closure member or cap is well adapted for insertion in closing position in the opening at the end of the container which may serve as a filling opening. This closure plate is well adapted for insertion into closing position in the body of the container without the use of special crimping tools or other special apparatus. When the closure plate is inserted from above into its final position as shown in Fig. 3, the hook flange 10, due in large part to its special flexible construction as described, will be automatically deflected inwardly slightly by engagement thereof with the container wall and when it reaches its final position will be caused by its resiliency and positioning to be embedded slightly into the inner surface of the container walls, thus providing not only a tight inner anti-shift joint or seal but also providing a firm connection capable of maintaining its holding qualities over long periods of time and during rough handling of the container, as in transit. The outer edge 11 of the hook flange 10 is normally positioned so that its diameter is somewhat greater than the inner diameter of the container body, whereby the flexible attaching flange is swung inwardly through considerable amplitude, and in its final position is urged outwardly due to resiliency of the metal to cause the edge 11 to bite in holding relation into the container wall. Also it will be noted that the wall of the body 1 is resilient, tend-

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ing to assume its original position after having been deflected outwardly slightly during insertion of the closure plate 4. Due to the flexible structure described, the connection thus tends to become stronger and the edge 11 of the hook flange becomes more firmly embedded in the container wall during handling and use of the container. This improved structure thus is effective in avoiding looseness of the closure member during handling with resultant objectionable shifting, and in avoiding accidental separation from the container in transit.

In the embodiment of the invention shown in Fig. 5, the structure and arrangement are similar to the above detailed disclosure of Figs. 1 to 4 inclusive, and corresponding parts are designated by the same reference numerals with the addition of the index *a*. In this embodiment the closure plate 4*a* has a skirt flange 9*a* provided with a flexible hook flange structure 10*a* substantially the same as in Fig. 3. Also, the plastic dispensing cap 6*a* may be substantially the same with the outer skirt flange 13 omitted.

In the embodiment of Fig. 5 an outer skirt flange 22 is formed on the closure plate 4*a* by doubling or bending the marginal portion of the plate so as to provide this flange which extends outwardly over the upper edge of the container wall and downwardly along the outer surface of the latter so as to function substantially in the same manner as the skirt flange 13 above described.

The embodiment shown in Fig. 6 is similar to that of Fig. 3 and corresponding parts are designated by the same reference numerals with the addition of the index *b*. In this embodiment the inner depending flange 9*b* has a part inwardly bent or deflected to form a flange part 12*b* corresponding generally to the structure shown in Fig. 3 and extending entirely around the top opening of the container as above described. However, in this embodiment the flange 9*b* is bent downwardly so as to provide a flange part 23 substantially parallel to the flange 9*b* and spaced inwardly from the surface of the container wall, and of considerably greater extent than that of the bend 14 as shown in Fig. 3. The attaching or hook flange 10*b* is bent inwardly along the lower edge of the flange part 23. For some purposes this construction provides a greater flexibility than that of Figs. 3 and 5.

In the embodiment of Fig. 7 the structure and arrangement are substantially the same as in Figs. 1 to 4 inclusive, and corresponding parts are designated by the same reference numerals with the addition of the index *c*. In this embodiment the top closure plate 4*c* is provided with an upper or marginal flange 8*c* similar to the flange 8 in Fig. 3 but of an outside diameter to fit closely within the inner surface of the walls of the container part 1*c*. The double reinforcing flange or rib 8*c* may be either partially open as shown in Fig. 7, or it may have its two parts substantially in close or contacting relation as shown at 8 in Fig. 3. The hook flange 10*c* is similar to that of the hook flange 20 for the bottom closure plate 2 shown in Fig. 3 with the exception that the inner receiving groove 21 is omitted, and the outer edge of the hook flange bites into the inner surface of the container wall in a manner similar to that disclosed in connection with the other embodiments.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without depart-

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ing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

The invention having thus been fully described, the following is claimed:

1. In a container, in combination, a container body having an enclosing wall and an opening, a closure member for said opening having a skirt flange extending entirely therearound and positioned for telescoping within said wall in close surface contact therewith, and a hook flange positioned at the edge portion of said skirt flange and longitudinally coextensive therewith and having an edge portion inclined outwardly toward said closure member and inclined to said wall and extending into the surface of said wall to form an inner anti-sift seal coextensive with said skirt flange and to retain the closure member in closing and sealing position.

2. In a container, in combination, a container body having an enclosing wall and an opening, a closure member for said opening having a skirt flange extending entirely therearound and positioned for telescoping within said wall in close surface contact therewith, a hook flange positioned at the edge portion of said skirt flange and longitudinally coextensive therewith and having an edge portion inclined outwardly toward said closure member and inclined to said wall and extending into the surface of said wall to form an inner anti-sift seal coextensive with said skirt flange and to retain the closure member in closing position, and said closure member being doubled upon itself adjacent to said skirt flange and bent to form an additional skirt flange engaging said wall at the opposite side thereof from the first mentioned skirt flange.

3. In a container, in combination, a container body having an enclosing wall and an opening, a closure member for said opening having a skirt flange extending entirely therearound and positioned for telescoping within said wall in close surface contact therewith, and a hook flange positioned on said skirt flange and longitudinally coextensive therewith and having an edge portion inclined outwardly toward said closure member and inclined to said wall and extending into the surface of said wall to form an inner anti-sift seal coextensive with said skirt flange and to retain the closure member in closing position, the lower or inner marginal portion of said skirt flange being deflected inwardly away from the outer part thereof which contacts with said wall and away from said wall and then reversely bent or deflected outwardly to form said hook flange and to impart increased flexibility thereto.

4. In a container, in combination, a container body having an enclosing wall and an opening, a closure member for said opening having a skirt flange extending entirely therearound and positioned for telescoping within said wall in close surface contact therewith, a hook flange positioned on said skirt flange and longitudinally coextensive therewith and having an edge portion biting into the surface of said wall to form an inner anti-sift seal coextensive with said skirt flange and to retain the closure member in closing position, the lower or inner marginal portion of said skirt flange being deflected away from said wall and then reversely bent or deflected to form said hook flange and to impart increased flexibility thereto, and said closure member being doubled upon itself adjacent to said skirt flange

and bent to form an additional skirt flange engaging said wall at the opposite side thereof from the first mentioned skirt flange.

5 In a container, in combination, a container body having an enclosing wall and an opening, a closure member for said opening having a skirt flange extending entirely therearound and positioned for telescoping within said wall in close surface contact therewith; a hook flange positioned on said skirt flange and longitudinally coextensive therewith and having an edge portion biting into the surface of said wall to form an inner anti-sift seal coextensive with said skirt flange and to retain the closure member in closing position, the lower or inner marginal portion 15 of said skirt flange being deflected away from said wall into position inclined away from the wall to form an inclined flange part extending entirely around the said container opening, and said skirt flange being reversely bent or deflected to form said hook flange, whereby increased flexibility is imparted to said hook flange.

6 In a container, in combination, a container body having an enclosing wall and an opening, a closure member for said opening having a skirt flange extending entirely therearound and positioned for telescoping within said wall in close surface contact therewith; a hook flange positioned on said skirt flange and biting into the surface of said wall to form an inner anti-sift 30

seal coextensive with said skirt flange and to retain the closure member in closing position, the lower or inner marginal portion of said skirt flange being deflected into position inclined away from the wall to form an inclined flange part extending entirely around the said container opening, said skirt flange being reversely bent or deflected to form said hook flange, whereby increased flexibility is imparted to said hook flange, and said closure member being doubled upon itself adjacent to said skirt flange and bent to form an additional skirt flange engaging said wall at the opposite side thereof from the first mentioned skirt flange.

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