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POWDER BOX

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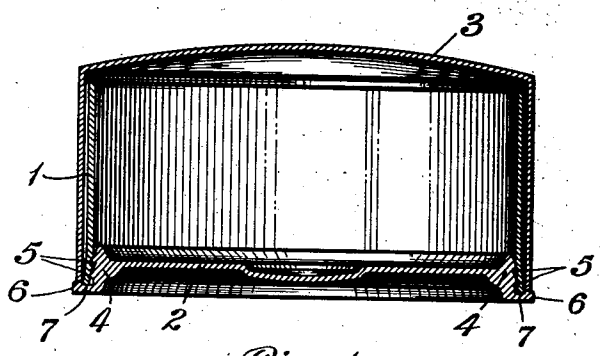


Fig. 1.

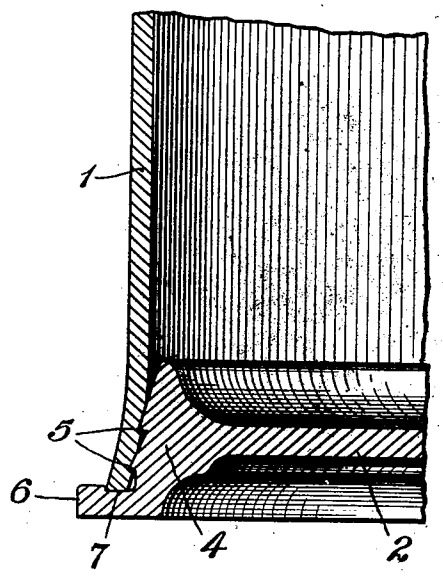


Fig. 2.

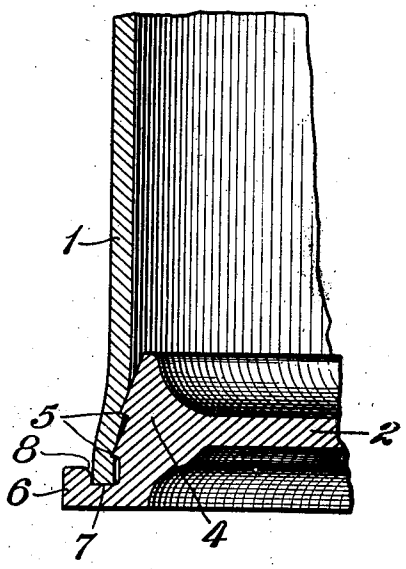


Fig. 3.

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POWDER BOX

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19 Claims. (Cl. 229—5.5)

The invention has relation to improvements in containers of paper or similar material, such as powder boxes, and more particularly to means for securing together the drum and base closure elements thereof, such boxes being usually composed of three elements, namely, a drum, a base forming a closure therefor, and a cover. Sometimes quantities of these elements separated from each other are sent to the face powder packer by the box maker, requiring subsequently various labor operations in the ultimate assembly.

Heretofore it has been customary to make the circumferential walls or the drum and its base closure of substantially the same height, and to telescope these parts the one over or in the other, and in so doing, air approximately equal to the cubic contents of the box is displaced and must escape through the joint between drum and base closure, the rapid telescoping movement resulting in high velocity of this air through such joint, causing powder to be carried into the joint. If adhesive is used to hold the parts together, this displaced powder is dusted over the moist glued surfaces, resulting in improper adhesion and in defective joining of the parts with consequent objectionable sifting in handling and transit. Other types of powder boxes have likewise been found to be objectionable in use.

It is one of the important objects of the invention to provide an improved joint for connecting the base and drum elements of containers of the class mentioned, so as to effectually guard against sifting or unintentional escape of the powder contents from the powder compartment or into the joints.

Another important object is to provide an improved joint for this type of container which is proof against sifting and wholly avoids the use of any adhesive in its construction.

A further object is to provide an improved connection between the drum and base, so arranged as to be easily assembled after filling the box with powder and to minimize the telescopic assembly movements, avoiding undue or objectionable rush of air through the joints of the container, with consequent blowing of the powder, and at the same time making a firm structural union which is proof against sifting of even the finest powder.

Another object is to provide a container of the class mentioned having an improved assembly of the parts thereof, whereby time and labor are saved in filling it with the powder and in the subsequent assembling thereof, while production costs are lowered.

Still another object is to provide an improved and commercially practicable sift-proof connection between a relatively stiff or rigid base and a relatively yieldable drum of thin material, such as thin paper board.

According to another feature of the invention, there is provided an improved mechanical connection between the drum and its base closure by means of a wedge plug on the base closure adapted to permanently expand the lower end portion of the drum, indent the drum wall, seal the connection and securely hold the parts in assembled relation.

Another object is to meet the limitations of the most advantageous materials.

Other objects of the invention will be in part pointed out in subjoined detailed disclosure of certain illustrative but preferred embodiments of the invention, and will be in part obvious in view of such disclosure.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

For a more comprehensive disclosure of the nature and objects of the invention, reference is made to the detailed description below of the illustrative embodiments, and to the accompanying drawing, in which:

Fig. 1 is a central vertical section of a face powder box, embodying the invention;

Fig. 2 is a detail fragmentary vertical sectional view of the same on an enlarged scale;

Fig. 3 is a similar view of a modification.

In the illustrative embodiment of Figs. 1 and 2 of the drawing, the drum 1 is made of yieldable or resilient material, such as thin paper, convolutely or spirally wound into cylindrical form to make the usual laminated structure. The base 2 forms a closure for the drum, being preferably composed of non-yieldable material, such as molded thermosetting synthetic resin of the ureal type, and 3 is the cover.

The base closure 2 is provided with a wedge plug 4, tapered upwardly at its outer surface, engaging the lower part of the interior of the drum 1 to permanently expand the same. The outer diameter of the base plug at its upper end is somewhat less than the inner diameter of the drum or ring 1 so that the small end of the base is readily received within the drum without any expansion of the lower end thereof. However, due to the taper of the base plug, the inner surface of the drum will contact with the outwardly

flared surface of the plug as soon as said plug has been entered only a short distance into the drum. Continued movement of the base plug into the drum will cause the lower end or edge of the drum to be deflected or flared outwardly throughout the entire periphery thereof. Hence, due to the relatively yielding and resilient nature of the drum and the relatively rigid nature of the base, a stress or tension will be created between these parts causing the drum resiliently to engage in close contact against the inclined surface of the base. Due to the nature of the drum and the material thereof, the assembly of the parts as described will cause a curvature of the outwardly flared drum end as indicated in Fig. 2. This curvature will vary with the nature of the drum material and thickness of the drum wall. In other words, the flaring of the drum end and the curvature of the flare are determined jointly by the taper of the base plug with reference to the drum walls, and by the characteristics of the drum material.

The base closure plug **4** is provided with means to positively engage into the drum surface, to seal, and securely hold the assembled parts in engagement, said means comprising a plurality of circumferential longitudinally wedge-shaped teeth or threads **5**, of progressively increasing diameter. These teeth or ribs as shown may have sharp apices extending preferably entirely around the plug and are found to be effective in practice to accomplish the functions mentioned, even though the connection is made, in powder boxes of ordinary toilet size, within a very limited space, namely, one quarter inch. For boxes of the nature of the illustrative embodiment herein disclosed, circumferential teeth, each ten one-thousandth of an inch in height and each extending slightly into the drum surface, that is, slightly beneath the general contour of said surface, as by cutting or biting into the surface of the drum wall a few thousandths of an inch, are preferably provided. Such teeth or ribs, when thus arranged to engage beneath the general contour of the drum surface, provide a connection which is positive in its nature and of sufficient strength to prevent separation of the parts and sufficiently tight to avoid sifting of the container contents under any such customary strains as the box may be expected to encounter. For other designs of boxes one of these circumferential ribs will suffice, or it may be desirable in other cases to employ more than two. The distance that the wedge plug projects into the drum is ordinarily in practice held to a minimum for two reasons: first material cost is less, and second, the amount of air displacement is reduced, which if excessive blows out a cloud of powder when the plug is forced home, causing extra labor to clean the boxes when packing.

It is to be noted that the retaining and sealing ribs or wedge-shaped teeth **5** are positioned directly upon the tapered surface of the base closure plug **4**, being positioned thereon one over another and spaced apart a sufficient distance to enable each tooth to engage and bite into the inner surface of the drum. The surface of the plug tapers or inclines gradually downwardly to the apex of each tooth but recedes abruptly below each apex whereby the latter is well adapted to function with the contacting drum surface. The diameter of the base plug at the apex of the upper tooth **5** is somewhat greater than the inner diameter of the drum so that said tooth will engage tightly in the drum to cause it to bite into the surface and to cause the flaring of the drum wall. Also it is important that the diameter of the apex of the lower tooth **5** be greater than the upper tooth so as to be positioned to bite into the surface of the outwardly flared or curved drum wall. Due to this arrangement each tooth **5** is most advantageously positioned for the accomplishment of its functions. Each tooth thus bites firmly into the drum surface, holding the parts firmly in assembled condition, under all normal conditions of use and handling, at the same time making a sift-proof joint, and avoiding the use of an adhesive.

The connection between the drum and the base closure is quickly and easily made and the opening through which the powder is filled in the drum is substantially that of the full inside diameter of the box, whereby filling of the box with dry powder can be instantly achieved.

It is desirable to provide the base closure **2** with an exterior bottom flange **6** to limit the assembly movements of the parts by engaging the lower edge of the drum. Also this flange may be formed with an annular groove **7**, at the base of the teeth **5**, and with which the lower edge of the drum has engagement at the end of the assembling movement, to thereby protect said edge and better hold the toothed engagement.

In Figure 3 of the drawing, a modification is shown wherein the groove **7** is provided with a beveled outer edge **8**, with which the lower edge of the drum has initial engagement prior to full entry into said groove, to thereby bend the said lower edge inwardly toward the circumferential teeth of the plug for better gripping effect.

It is preferred to make the base closure of a molded thermosetting synthetic resin. The thermosetting resins of the ureal type are ideal for the purpose, as they are medium in price and can be obtained in bright colors suitable for face powder boxes and they have a pleasant feel and appearance. In the molding of such materials the parts can be knocked out of the mold cavity if the grooves forming undercuts in the direction in which the parts are removed from the mold are not more than ten thousandths deep. Parts so knocked out are much less expensive than parts with undercuts so deep that the mold has to be made of split cavity construction, or the grooves cut as a secondary operation.

In either of the illustrative embodiments shown, the upper end of the drum **1** opposite to the base closure plug **2** will be closed by a frangible head or similar cover in a manner known in the art. Such a frangible head is ordinarily made of thin paper or similar thin material stretched over the upper edges of the drum and pasted or otherwise attached to the drum so as to make a tight joint which will confine the powder so as to avoid sifting.

When the powder has been placed in the drum, the base closure plug **4** is inserted into the lower end of the drum, the two parts telescoping with each other. The edge portion of the drum wall engages with the tapered surface of the plug thus expanding the drum by forcing its walls outwardly as described. As the parts are moved into home position the apices of the ribs or teeth **5** are very positively wedged against the inner surface of the drum and caused to bite thereinto, holding the parts firmly in assembled relation and making a tight sift-proof joint. The flange **7** functions as a stop for the assembling movements and also as a protector and retainer for the lower edge of the drum. The engagement of the

drum with the tapered surface of closure plug and with the teeth 5 thereof during assembly causes the drum to curve or flare outwardly and to yieldingly engage with said teeth so as to hold the parts in assembled relation, as described. In case of the embodiment of Fig. 3, the edge of the advancing drum wall contacts with the inclined cam surface 8 as the parts approach final position, thus forcing the lower edge of the drum wall inwardly and forming a reverse or ogee curvature of the drum wall and at the same time firmly urging the lower edge portion of the wall inwardly into positive engagement with or into firm biting contact with the lower retaining tooth 5. Thus the two parts are securely locked in final assembled relation with each other. This form therefore has advantages in providing a stronger and more durable connection. The cover 3 is finally placed on the assembled drum and base, the lower edge thereof resting upon the flange 7.

While the container herein disclosed is indicated as being cylindrical or circular in horizontal cross section for which the improvements are well adapted, it is to be understood that the improvements are adapted for embodiment in other shapes of containers such as oval, square, polygonal of various numbers of sides, etc.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing 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.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a box, in combination, a drum, a closure therefor having a wedge plug engaging the end part of the interior of said drum to permanently expand the same and to cause constant pressure between the closure and drum, and a plurality of spaced teeth extending continuously around the wedge plug and indenting the drum to securely hold the parts together, one of the lower of said teeth being of greater diameter than that next above.

2. In a paper box, in combination, a drum, and a base closure therefor having a wedge plug engaging the lower part of the interior of said drum to permanently expand the same and provided with means to indent, tend to seal and securely hold the drum, comprising a plurality of circumferential longitudinally wedge-shaped teeth of increasing diameter.

3. In a paper box, in combination, a drum, a base closure therefor having a wedge plug engaging the lower part of the interior of said drum to permanently expand the same, and means on said plug to indent, tend to seal and securely hold the drum, said means including a plurality of circumferential parallel longitudinally wedge-shaped teeth of increasing diameter.

4. In a paper box, in combination, a drum, a base closure therefor having a wedge plug engaging the lower part of the interior of said drum to permanently expand the same, means on said plug to indent and securely hold the drum, said means including a plurality of parallel, longitudinally wedge-shaped teeth extending around the plug and being of increasing diameter from top to bottom, and an exterior flange on said base closure provided with an annular groove with which the lower edge of said drum engages.

5. In a box, in combination, a resilient drum, a base closure therefor having a wedge plug engaging the lower part of the interior of said drum to permanently expand the same, means on said plug to indent and securely hold the drum, said means including a plurality of parallel longitudinally wedge-shaped teeth extending around said plug and being of increasing diameter from top to bottom, an exterior flange on said closure provided with an annular groove at the base of said teeth with which the lower edge of said drum engages, said groove having a beveled outer edge with which the lower edge of the drum has engagement to bend the same inwardly against said teeth.

6. A base closure for the drum element of a paper box, having a wedge plug provided with a plurality of longitudinally wedge-shaped teeth extending therearound and being of increasing diameter from top to bottom.

7. A base closure for the drum element of a paper box, having a wedge plug provided with a plurality of longitudinally wedge-shaped teeth extending continuously therearound and being of increasing diameter from top to bottom, and an exteriod flange having an annular groove at the base of said teeth.

8. A closure for the drum element of a paper box, having a wedge plug provided with a plurality of parallel longitudinally wedge-shaped teeth extending continuously therearound and being of increasing diameter from top to bottom, and an exterior flange having an upwardly directed annular groove at the base of said teeth, said groove having an inwardly inclined outer edge.

9. A rigid closure for the drum of a paper box, said closure having a wedge plug with a tapered surface, and having a retaining tooth extending continuously around the tapered surface, said tapered surface gradually inclining downwardly to the apex of said tooth and having an abrupt shoulder immediately below said apex, whereby said apex can bite into the surface of the drum to hold it in assembled relation.

10. A rigid closure for the drum of a paper box, said closure having a wedge plug with a tapered surface, and having a retaining tooth extending around the tapered surface, said tapered surface gradually inclining downwardly to the apex of said tooth and having an abrupt shoulder immediately below said apex, whereby said apex can bite into the surface of the drum to hold it in assembled relation, said closure having a drum-supporting flange positioned beneath said retaining tooth.

11. In a box, in combination, a drum of resilient material, a closure having a plug of relatively rigid material adapted to enter one end of said drum and being of greater outside diameter than the inner diameter of said drum so as to expand said drum when entered, retaining means on said plug for biting into the surface of said drum when expanded for retaining the parts in assembled relation, and means engaging the expanded part of said drum and holding it under stress in an ogee curvature against said retaining means.

12. In a box, in combination, a drum of resilient material, a closure having a plug of relatively rigid material adapted to enter one end of said drum and being of greater outside diameter than the inner diameter of said drum so as to expand said drum when entered, means on said plug for biting into the surface of said drum when expanded for retaining the parts in assembled relation, and an inclined cam element

on said closure engaging the lower edge of said drum to urge it inwardly against said biting means.

13. In a box in combination, a resilient drum, a closure therefor having a wedge plug engaging an end part of the interior of said drum and holding said end part in permanently expanded condition in opposition to the resiliency thereof so as to cause contact pressure between the closure and drum, and sharp holding means on said closure urged by said pressure into biting engagement into the surface of the drum and securely holding the closure and drum in assembled relation.

14. In a box in combination, a resilient drum, a closure therefor having a relatively rigid wedge plug engaging an end part of the interior of said drum and holding said end part in permanently expanded condition in opposition to the resiliency thereof so as to cause contact pressure between the closure and drum, and a sharp tooth means extending around the wedge plug and biting into the drum and securely holding the parts together.

15. In a paper box in combination, a drum, a closure therefor having a wedge plug engaging the interior of an end portion of said drum and permanently expanding the same, holding means on said plug engaging and securely holding the drum, and an exterior flange on said base closure provided with an annular groove in which the end portion of said drum is engaged adjacent to said holding means so as to hold the end portion of the drum inwardly in holding engagement with said holding means on the plug.

16. In a box in combination, a resilient drum, a closure therefor having a relatively rigid wedge plug engaging the interior of an end portion of said drum and permanently expanding said end portion, holding means on said plug engaging the drum and extending into the inner surface thereof so as to positively engage and securely hold the drum, an exterior flange on said closure provided with an annular groove in which the edge portion of said drum engages, said groove having its outer wall inclined inwardly and downwardly so as to engage the edge portion of the drum when the latter is being assembled with the closure, thus urging the drum edge portion inwardly into permanent engagement against said holding means and locking the closure and drum in assembled relation.

17. In a box in combination, a drum of resilient material, a closure having a plug of relatively rigid material adapted to enter one end of said drum and being of greater outside diameter than the inner diameter of said drum so as to cause expansion of said drum when entered and to effect a constant pressure between the plug and drum, and a rigid continuous peripheral tooth on said plug having a sharp holding edge engaging against the inner surface of the drum and urged into biting engagement therewith by said constant pressure so as to retain the parts in assembled relation and to make a tight joint therebetween.

18. In a box in combination, a drum of resilient material, a closure having a plug of relatively rigid material adapted to enter one end of said drum and being of greater outside diameter than the inner diameter of said drum so as to cause expansion of said drum when entered and to effect a constant pressure between the plug and drum, a continuous peripheral tooth on said plug having a sharp holding edge engaging against the inner surface of the drum and urged into biting engagement therewith by said constant pressure so as to retain the parts in assembled relation and to make a tight joint therebetween, and means on said closure including a peripheral groove for receiving and holding the edge portion of said drum in its final position against said peripheral tooth.

19. In a paper box in combination, a drum, a closure therefor having a wedge plug engaging the interior of an end portion of said drum and permanently expanding the same, holding means on said plug engaging and securely holding the drum, and retaining means positioned adjacent to said holding means and engaging the drum and retaining it in inward holding engagement with said holding means on the plug.

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