United States Patent

[11] 3,563,417

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[54] **DISPENSING GRID**
6 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **222/189**
[51] **Int. Cl.** **A47g 19/24**
[50] **Field of Search** ..... 222/189, 196.1, 480, 565, 556, 196.3, 485; 239/(Inquired); 215/100, (Inquired)

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ABSTRACT: A dispensing grid for use in a dispenser for solid, particulate matter, such as salt, features rounded upper surfaces and wedge-shaped lower surfaces, the intersecting ribs comprising the grid preferably being at two levels. The grid is preferably disposed on an interior surface of the dispenser, across an opening through which dispensed material may pass, and beneath a flush-fitting closure. The rounded upper surfaces minimize salt entrapment beneath the flush-fitting closure, and the chisel-point lower surfaces break up agglomerated lumps of the material.

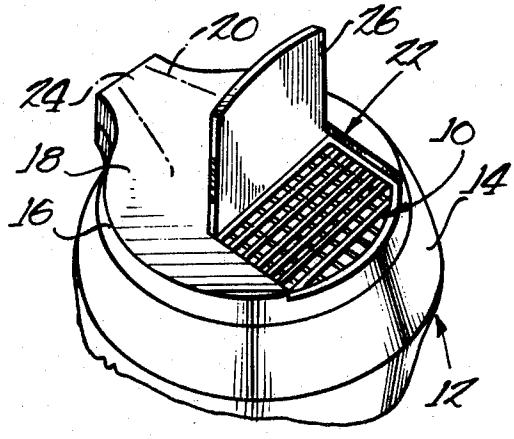

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Fig. 1.

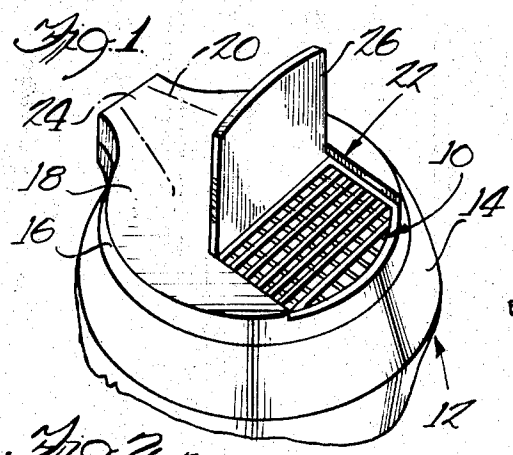


Fig. 3.

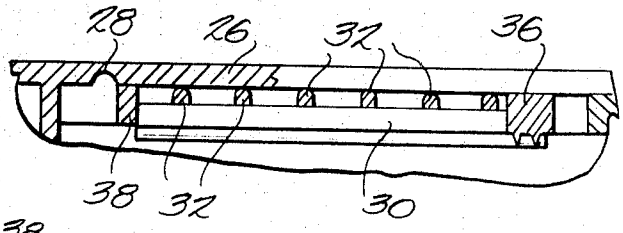


Fig. 2.

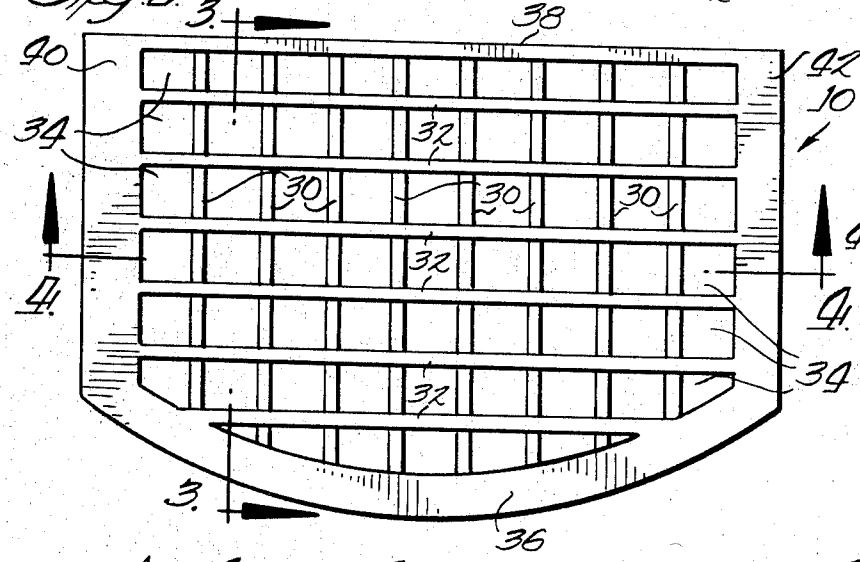


Fig. 7.

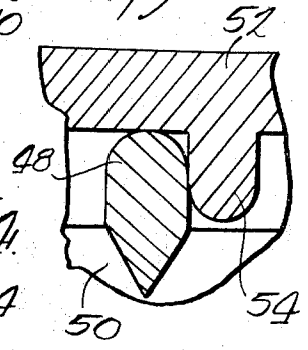


Fig. 4.

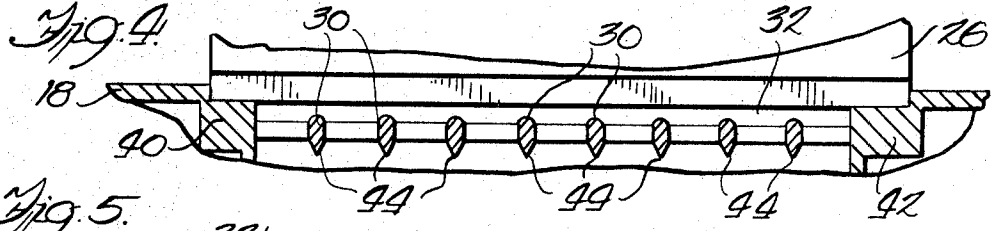


Fig. 5.

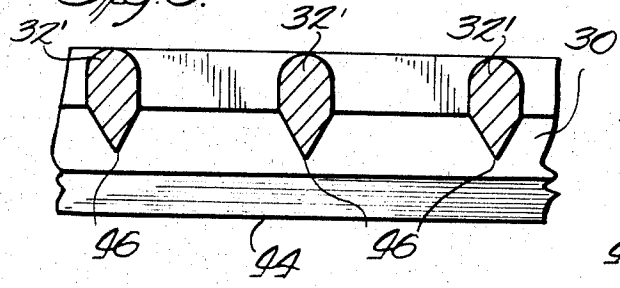
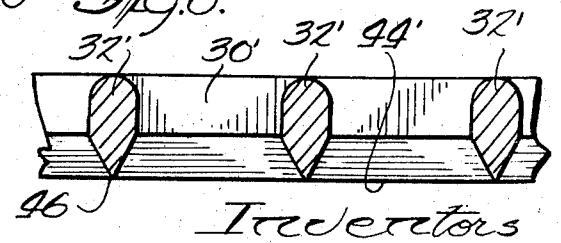


Fig. 6.



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DISPENSING GRID

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a dispensing grid in an apparatus for the dispensing of particulate solid material. More particularly, it relates to a dispensing grid of improved flow characteristics which may be disposed across the dispensing opening of a container so as to allow a closure means for said opening to be completely closed.

For convenience herein, the invention will be described with particular reference to a salt (sodium chloride) sprinkler device. It should be understood, however, that the invention is not limited thereto and can be embodied in the form of a sprinkler (or shaker) device for a wide variety of materials, but, most advantageously, for particulate solids, e.g., various condiments in granular form, granular sugar, granular foodstuffs and other edible and nonedible granular substances.

2. Description of the Prior Art

In the past, many types of dispensing grids for dispensers with closures have been proposed, but with many attendant disadvantages. Some grids did not permit the exterior surface of the closure to be coplanar with the exterior surface of the container top when the closure was shut. This made stacking of the container for either storage, shipment or display purposes difficult. Other grids were such that dispensed product remained on the grid when the dispensing operation was completed. The remaining particles would then be entrapped between the grid and the closure, thus preventing the closure from being completely shut. This not only was inconvenient for the user of the dispenser but it also created a sanitation hazard because foreign objects could find their way into the dispenser through the resultant opening.

One attempt made to avoid this result was to lower the dispensing grid into the container so that any remaining material would not interfere with the shutting of the closure. This solution led to container design problems and had the countervailing disadvantages of increased cost and reduction in the volume of material the dispenser was able to hold.

Another shortcoming of the prior art devices is that they normally had no means with which to break up lumps of agglomerated solid material which might form inside the dispenser, especially under ambient conditions of relatively high humidity. Such agglomerates interfered with material flow and resulted, in effect, in material loss because it could not be dispensed.

It is accordingly an object of this invention to provide a dispensing grid adapted for use with flush-fitting closures. It is another object to minimize the area of engagement between the dispensing grid and the overlying closure. It is another object to minimize the amount of salt entrapped between the dispensing grid and the closed closure so that the closure can be completely shut. Another object is to provide a dispensing grid which will permit the use of a closure which is flush with the top surface of the container in its closed position.

It is an additional object of this invention to provide a dispensing grid which will substantially aid in the breaking up of agglomerated lumps of the material to be dispensed. It is a further object to provide a dispensing grid which can be placed near an edge of one surface of the container whereby so-called "dead" spaces within the container are substantially eliminated. It is another object to provide a dispensing grid which, for a given size of opening in the container, provides the maximum amount of open area through which material may flow, consistent with a given size for the grid openings.

It is another object of this invention to provide a dispensing grid surface which copes with the aforementioned problems, fulfills the aforementioned objects and has the aforementioned desirable features and yet can be integrally molded of low cost plastic, e.g., polyethylene or similar material, and using low cost, conventional, two-die molding techniques.

Further and additional objects will become apparent from the following description, accompanying drawings and appended claims.

SUMMARY OF THE INVENTION

In a particular embodiment the dispensing grid comprises an integrally molded plurality of intersecting sets of ribs, at least one set having rounded upper surfaces and the other set having downwardly disposed tapers, knife or chisel edges, or equivalent. In a preferred embodiment, the grid of the present invention comprises two sets or series of intersecting spaced ribs, the upper surfaces of one set being disposed above the upper surfaces of the other set, both sets having curvilinear upper surfaces and chisel-point lower surfaces.

The grid is located on the underside of, and athwart the opening in a flat wall of a dispenser for particulate material. An integrally molded closure cover seals off the opening and is coplanar with the flat wall when the closure is in its closed position. While the undersurface of the closure cover may be flush with the upper extremities of the upper level of ribs in the fully closed position, no salt entrapment results even after repeated usage because salt granules slide down the curved upper surfaces of the ribs.

Because of recognized advantages, the structure of the present invention is molded as a unitary structure in plastic. The selected plastic should be readily moldable by conventional low cost techniques and should preferably have high strength, reasonable resilience and sufficient body to maintain shape under normal usage. It should also be inert, free from objectionable odors, and should otherwise meet structural, sanitary and aesthetic requirements.

Suitable plastics may include, but are not limited to, polyethylenes, polypropylenes, polyamides, acetate-butyrate copolymers, polyvinyl chloride polymers and copolymers, 6 polystyrene, and compatible combinations thereof, preferably polyethylenes and/or polypropylenes. The plastic may also contain necessary or desirable additives, such as dyes, plasticizers, extenders, and the like, as those skilled in the plastic molding art will recognize.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be more clearly understood from the following detailed description of preferred embodiments, read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a fragmentary, perspective view of a dispensing apparatus incorporating a preferred embodiment of the present invention;

FIG. 2 is an enlarged top plan view of the dispensing grid of FIG. 1;

FIG. 3 is a section view taken along line 3–3 of FIG. 2, to which has been added a fragmentary showing of related structure including the overlying, flush-fitting closure in its closed position;

FIG. 4 is a section view taken along line 4–4 of FIG. 2, to which has been added a fragmentary showing of related structure including the closure in its open position;

FIG. 5 is an enlarged fragmentary section view of an alternative embodiment of the dispensing grid;

FIG. 6 is an enlarged fragmentary section view of another alternative embodiment of the dispensing grid; and

FIG. 7 is an enlarged fragmentary section view of another embodiment illustrating how the grid of the present invention may be employed in conjunction with a ribbed closure to releasably secure the closure in the closed position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 shows dispensing grid 10 mounted in a fragmentarily illustrated dispensing apparatus 12. Such a dispenser would be useful for storing and making available for use any type of solid matter which is used in granular form. It would find particular application in the dispensing of foodstuffs such as salt, pepper, sugar, ground cinnamon, flour, and the like.

The dispensing apparatus 12 comprises body or container 14 and top or end closure 16. The major part of container 14 is cut away for economy in drawing; it may take various shapes

but should be convenient to handle, aesthetically pleasing, and capable of holding a convenient amount of salt. Top member **16** comprises flat wall member **18**, preferably with two openings **20** and **22** therethrough through which salt may be removed from the container. The openings **20** and **22** are provided with closures **24** and **26**, respectively, to seal the openings when the container is not being used. Openings **20** and **22** are provided with devices through which salt may be dispensed. Opening **20** may have, for example, a pouring spout and closure combination integrally hinged along one edge such as that disclosed in the copending U.S. Pat. application of Albert Yochim for DISPENSING APPARATUS, Ser. No. 766,720 filed Oct. 11, 1968.

Opening **22** is provided with the dispensing grid of the present invention, embodiments of which are illustrated in FIGS. **2—6**. The grids of the present invention may advantageously serve as the perforated sprinkler plate or sifter grate disclosed in the copending U.S. Pat. applications of Maynard E. Nyquist, Ser. No. 778,390, entitled A PLASTIC CONTAINER TOP WITH COMBINATION CLOSURE AND SPRINKLER, and Benjamin M. Bartilson and Harold E. Trumbull, Ser. No. 778,562, now U.S. Pat. No. 3,499,588, entitled PLASTIC CONTAINER TOP WITH COMBINATION CLOSURE AND SPRINKLER both filed contemporaneously herewith. Closure **26** is hingedly connected to flat wall **18** along one edge of opening **22** by thinned section **28**. The grid **10** is composed of two sets of perpendicularly intersecting ribs **30** and **32**. The rectangular grid openings **34** thus formed, in contrast to the circular openings of the prior art, maximize the area of the dispensing passageways for a given size of opening **22**.

The proper size of grid openings **34** will, of course, vary with the size of the particles of the material contained in the dispenser. The grid opening size will also vary with the intended dispensing action. If it is desired that the dispensed material should flow through the dispensing surface in a continuous stream when the dispenser is inverted, the grid openings should be relatively large. If, however, it is desired that the material flow through the dispensing grid only when the container is agitated or shaken, the grid openings should be relatively small. The optimum grid size for any particular material and for the type of dispensing action desired is best determined by experimentation.

Opening **22** and dispensing grid **10** are disposed so as to extend substantially to an edge of wall member **18**. This disposition serves to minimize the volume of dead space behind which residual salt can be entrapped in dispensing apparatus **12**.

As is best shown in FIG. **3**, dispensing grid **10** is disposed on the underside of wall member **18** and athwart opening **22**. With grid **10** so positioned, closure **26** may then be closed as shown with its upper surface coplanar with the exterior surface of wall member **18**, thus providing a planar surface for easy stacking of the containers.

Ribs **30** are disposed between front support **36** and rear support **38**. Ribs **32** are disposed between side supports **40** and **42** depending from wall member **18**, except for the rib furthest removed from hinge **28**, which is disposed within the curvature of front support **36**. While ribs **30** and **32** are disposed at right angles to one another, it should be understood that the invention is not limited thereto. Ribs may alternatively intersect at various oblique angles. In fact, either or both ribs **30** and **32** may be curved and may be disposed in various intersecting relationships to one another.

Ribs **30** are vertically displaced from ribs **32**, although molded integrally therewith. Ribs **32** (and, optionally, ribs **30**) have convexly rounded (e.g., semicircular) upper surfaces and are disposed so that when closure **26** is flexed to the closed position it tangentially engages the curved upper surfaces thereof in a line contact.

The curved upper surfaces of ribs **32** serve two purposes. First, they minimize the area of engagement between the dispensing surface and the closure **26**. Second, any salt which remains on the upper surface of grid **10** after the pouring operation is completed will tend to roll off and fall back into the container. Thus, in two distinct manners the curved upper surfaces minimize the amount of salt which can become entrapped between the closure and the grid when the closure is flexed to the closed position. The problem of being unable to close the lid because of entrapped salt is therefore avoided.

While the upper surfaces are described as convexly curved, it should be understood that equivalent configurations are encompassed thereby. Thus, for example, the upper surfaces could be upwardly tapered so as to present line contacts with the cover and also present a downwardly sloping surface whereby residual salt would roll off and fall back into the container.

The area of engagement between closure **26** and grid **10** is also minimized by the aforementioned vertical displacement of the intersecting ribs. Thus, in the embodiment of FIGS. **1—4** only ribs **32** contact the cover, thereby further minimizing any entrapment problems and insuring complete closing of closure **26**. This feature assures that after use, the container will still have a planar top surface and be easily stacked. It also assures that foreign matter will not be able to enter the container through openings between closure **26** and wall member **18**.

In the embodiment of FIGS. **1—4**, the lower surfaces of ribs **30** are tapered to form chisel or knife edges or points **44**. These knife edges assist in breaking up agglomerated lumps of salt. If the grid size is such as to yield a rather continuous flow, as discussed above, the relatively rapid particle flow will cause any agglomerates to impinge on the chisel edges with sufficient force to break them up. Thus a more even flow of salt through the dispensing grid will be maintained.

Alternatively, if the size of the grid openings is such as to require shaking or agitation for material to pass through the dispensing grid, the resulting reciprocating movement of the dispenser would also cause the agglomerates to impinge on the chisel edges with sufficient force to break them up. This prevents the grid openings **34** from becoming clogged up.

While the edges are referred to as chisel or knifelike edges, such language should, of course, be construed functionally. It is intended that the lower surfaces present a narrow lower extremity which would tend to break up impacting agglomerates. The exact configuration depends upon the material of the grid, the nature of the agglomerates, the type of dispensing, and the like.

The embodiment of FIG. **5** is similar to that of FIGS. **1** to **4** except that the upper set of ribs, designated in FIG. **5** as **32'**, also has chisel-edged lower extremities, i.e., chisel edges **46**, to complement the chisel edges **44** of the lower set of ribs. The embodiment of FIG. **6** is similar to that of FIG. **5**, except that both sets of ribs, designated in FIG. **6** as **30'** and **32'** with chisel edges **44'** and **46**, respectively, are at the same level, and the tope extremities of the curved upper surfaces of each are coplanar. While this embodiment has the disadvantage over the embodiments of FIGS. **1—5** in that it has a greater area of engagement between the grid **10** and the closed closure **26**, it has the advantage that it occupies less volume within the container.

FIG. **7** shows another specific embodiment of the present invention wherein the rounded and sharpened ribs **48** and **50** are at two levels and closure **52** has one or more ribs on the underside thereof which frictionally interfit in side-by-side relationship so as to releasably secure closure **52** in the closed position. While only one cover rib **54** is depicted in FIG. **7**, it should be understood that there may be a plurality of spaced cover ribs which interfit with several or all of the upper ribs **48** of the grid, on one or both sides of each rib. The cover ribs can, if desired, completely fill the spaces between the respective upper ribs of the grid.

While the configuration of the cover rib **54** is preferably convexly rounded, as depicted, to complement the rounded upper surface of grid rib **48**, other configurations can also be employed. The cover ribs and/or grid ribs may also have de-

tents, registering recesses or the equivalent to increase the grip between the cover and the grid. To facilitate the low-cost molding of this embodiment, the rib or ribs on the cover should be vertically disposed when the cover is in the open position as depicted in FIG. 1. The ribs of the grid would, of course, have to be reorientated 90° to accommodate this embodiment.

It is readily apparent from the foregoing description and drawings that the dispensing grid of this invention could be, if made from injection grade polyethylene or similar material, manufactured by conventional, low cost, high speed, two-die molding techniques, as discussed in the aforesaid applications of Messrs. Yochim, Nyquist and Bartilson-Trumbull. Such ease and economy of manufacture is essential in the marketing of such high volume, low cost materials as salt.

It will be obvious that certain modifications of the specific embodiments shown may be made without departing from the spirit and scope of this invention. It will thus be seen that a pouring surface for a dispensing container has been provided which is closely adjacent to its associated closure yet minimizes the amount of dispensed substance which may become entrapped between the closure in its closed position and the pouring surface. The pouring surface additionally allows the top surface of the closure in its closed position to be coplanar with the top surface of the container and provides means for breaking up agglomerated lumps of the dispensed material.

While particular embodiments of this invention are described above, it should be understood, of course, that the invention is not to be limited thereto. Many modifications may be made in the light of the present disclosure; and it is contemplated, therefore, to cover any such modifications as fall within the true spirit and scope of this invention.

We claim:

1. An apparatus suitable for dispensing granular substances comprising:
   a. a container having at least one substantially flat wall member with an opening therethrough;
   b. a cover integrally formed with said flat wall member, hingedly attached to the flat wall member adjacent one side of said opening and substantially registering with said opening when said cover is in a closed position, and hingedly movable away from said closed position; and
   c. a grid of ribs integrally formed with said flat wall member and disposed across said opening comprising:
      1. at least one first set of ribs having upper and lower surfaces, with the upper surfaces having convexly curved cross sections; and
      2. at least one second set of ribs disposed to intersect said first set and having upper and lower surfaces with the upper surfaces disposed substantially below the upper surfaces of said first set and with the lower surfaces tapered to a substantially sharp edge at the lower extremity Thereof.

2. The apparatus of claim 1 wherein the lower surfaces of said first set of ribs are tapered to a substantially sharp edge at the lower extremity thereof.

3. The apparatus of claim 1 wherein the upper surfaces of said second set of ribs have convexly curved cross sections.

4. The apparatus of claim 1 wherein the ribs of said first set are perpendicularly disposed to the ribs of said second set.

5. The apparatus of claim 1 wherein both said first and second sets of ribs have convexly curved upper surfaces and chisel-edged lower surfaces.

6. The apparatus of claim 1 including depending rib means integrally molded on the undersurface of said cover and registering with at least one of the ribs of said first set so as to frictionally grip the same when said cover is in the closed position.