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C. ROESCH

2,149,790

TREATING AND PACKING POWDERED MATERIAL

Filed April 22, 1938

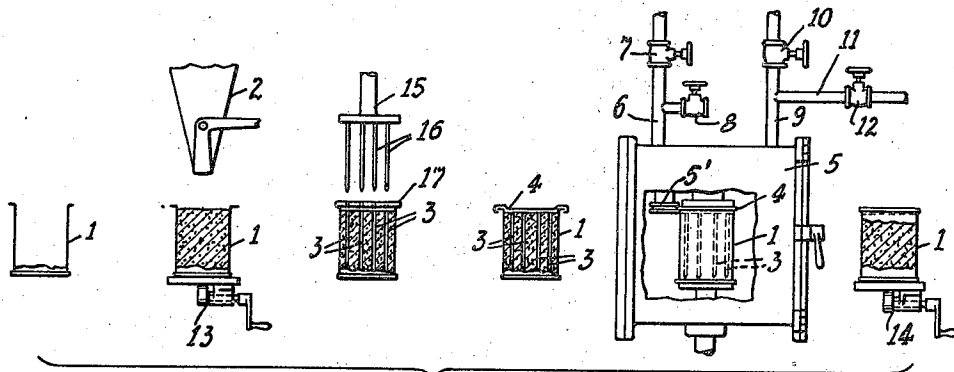


FIG. 1.

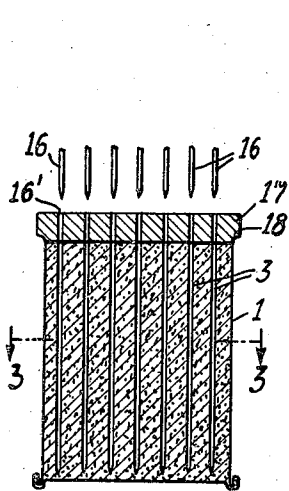


FIG. 2.

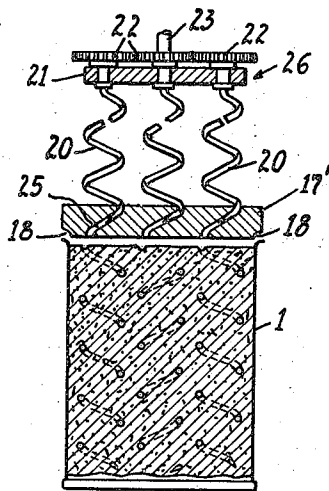


FIG. 5.

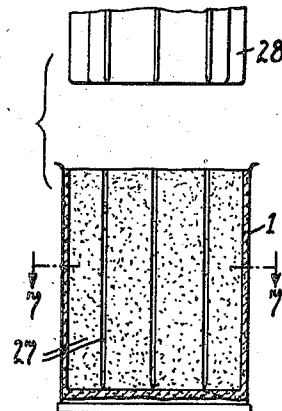


FIG. 6.

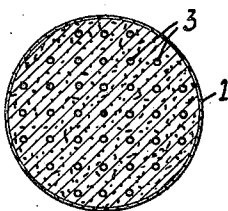


FIG. 3.

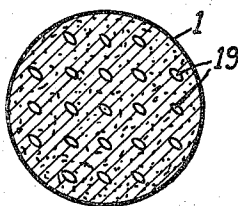


FIG. 4.

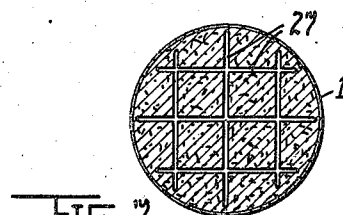


FIG. 7.

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TREATING AND PACKING POWDERED MATERIAL

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8 Claims. (Cl. 99—189)

This invention relates to a process for packing powdered material, such as flour, sugar, cocoa, baking powder, powdered milk and similar products in containers, and in which the contents in the containers are vacuumized or subjected to a selected gas.

During the process of packing powdered material in cans and similar containers, certain difficulties arise when vacuumizing the material and before the containers are hermetically sealed. When withdrawing air or other gases from the powdered material in a container, disturbances are created in the powdered material, so that part of the powder is withdrawn during the exhausting process. This results in waste of the powdered material; develops an imperfect closure of the container; clogs the strainers and interferes with the proper operation of the vacuumizing and closing mechanisms.

Furthermore, because the powdered material expands during the vacuumizing process, an extra space or headroom has to be provided above the powder in the container, resulting therefore into a larger size container, requiring more material and thereby making it more expensive than one wherein the powder can reach substantially to the top.

The principal object of the present invention is to overcome the above objections by providing, prior to vacuumization, passages or ducts within the material for the flow of air or other gases from the interior of the material to the outside, thus eliminating disturbances and expansion of the powdered material and making its treatment more effective.

This and other objects will appear evident in this specification in connection with the drawing and particularly in the subjoined claims.

In the drawing—

Fig. 1 is a diagrammatic view of a processing line for packing and treating powdered material in containers.

Fig. 2 is a vertical section through a filled container, showing straight passages or ducts in the powdered material.

Fig. 3 is a sectional plan view on line 3—3 of Fig. 2.

Fig. 4 is a sectional plan view showing a modified form of the passages in the material.

Fig. 5 is a vertical section through a container, showing curved passages in the powdered material.

Fig. 6 is a vertical section through a filled container, showing another form of passages or ducts in the powdered material and

Fig. 7 illustrates a sectional plan view on line 7—7 of Fig. 6.

Referring to Fig. 1, the container 1 in the processing line is first placed under a filling device 2 from which a predetermined amount of powdered material is made to flow into the container. Thereafter this material is provided with ducts or passages 3 in a manner to be described hereafter. A cover or closure 4 is then loosely clinched to the container 1, or held thereto in any other suitable manner, leaving gaps or spaces between the closure 4 and the top of the container 1.

To vacuumize the material, the container is passed into a vacuumizing chamber 5, or if so desired, may be connected with a conventional exhausting apparatus of known construction.

In the illustration a pipe 6, equipped with a valve 7 and a release valve 8, leads from the chamber 5 to an exhaustion pump (not shown), wherewith to vacuumize this chamber. Should it be desired to treat the powdered material with a selected gas, a pipe 9 is provided on the chamber, having a valve 10, as well as a branch pipe 11, equipped with a valve 12. Pipe 9 leads from chamber 5 through valve 10 to the gas supply and also through valve 12 to a gas removal mechanism (not shown).

During the exhausting process the filled container is held in chamber 5, which is closed to the atmosphere. In the initial stage all the valves 7, 8, 10 and 12 are closed. Thereafter valve 7 is opened, allowing the withdrawal of air or other gases from the chamber and the material, by means of the suction in pipe 6.

It is evident, that the provision of ducts or passages 3 in the material permits the withdrawal of substantially all the air or other gases from within the bulk of the material to the passages and from there out.

Since the distance for the travel of air or gases from the material to the passages 3 is very short, the thereby offered resistance is insufficient to cause fluffing and expansion of the powder.

After the material has thus been vacuumized, container 1 is hermetically sealed by a sealing or closing mechanism 5'. Thereafter valve 7 is closed and valve 8 opened, establishing atmospheric conditions in chamber 5 and allowing the removal of the container from the chamber.

Should the material have to be treated with a selected gas, the exhausting or vacuumizing operation remains the same. The process comprises first opening valve 7, while the other valves 8, 10 and 12 are closed. After the desired degree of

exhaustion has been reached, valve 7 is closed thereafter and valve 10, in the gas supply line 9 is being opened. The selected gas entering the chamber and the powdered material, will be thoroughly absorbed by the powder, finding an easy access along the passages 3 and from there into the interior of the material.

It is understood that this same process may be repeated and that the material may be vacuumized and gassed a number of times, so as to eliminate substantially all the air, a result not attainable with only one treatment.

After the gas has thus found its way into the previously vacuumized powder, the closure or cover 4 is then hermetically sealed to the container by a revolving sealing mechanism 5' of known construction. Thereafter valve 10 is closed and the gas in chamber 5 is made to pass through pipe 11 by opening valve 12. After the gas has been withdrawn from the chamber, valve 12 is closed and valve 8 opened permitting the air to enter. Having thereby established atmospheric conditions in the chamber, it may now be opened for a removal of the container.

It is of course understood, that any type vacuum machine and vacuum-gas machine, as well as container and closure for same may be used in connection with my invention.

To compact or densify the material in the container, a cam operated shaking device 13 is provided at the filling station of the processing line. Compactness of material is especially required so as to prevent the ducts or passages 3 from being disturbed or demolished during transportation from the piercing device 15 to the vacuumizing chamber 5.

After the containers have been sealed and left the chamber, a second shaker 14 will be applied to agitate the sealed material and destroy and eliminate the channels 3 therein.

Figs. 2 and 3 show the material to possess passages 3 having a circular cross-section. They are made by a piercing device 15 provided with individual needles 16 which are pointed at their lower ends. These needles are guided in a disk 17; having holes corresponding with the spacings of the needles. A shoulder 18 on disk 17 provides a means for locating this disk and the piercing device on the container.

During operation the disk or guiding element 17 is first placed onto the filled container as shown. Thereafter the needles 16 of the piercing device 15 pass through the holes 18' of the guiding element and penetrate the material far enough until their pointed ends substantially reach the bottom of the container.

The guiding element 17 serves the purpose to prevent the flat or levelled surface of the material from being raised by frictional contact at the circumference of the needles at the time they are withdrawn from the compacted powder.

Since the degree of frictional contact between the needles and the material varies with the nature of the latter—as for instance the coarseness of the granules—a guiding element 17 may not be required in every case.

In order to reduce the frictional contact, needles 16 may be made to rotate on their holder, in a manner similar to that shown in Fig. 5 to be described hereafter. Instead of using needles with a circular cross-section, other formations, as for instance needles shaped for producing elliptical ducts 19, Fig. 4, or similar shaped passages may also be used.

The piercing device 26 of Fig. 5 illustrates the

adoption of needles 20 in form of helixes, rotatably held in a plate or holder 21 and turned by suitable gearing 22 from a center shaft 23. The guiding element 17', provided with helical shaped holes or channels 25, permit needles 20 to be screwed into and out of the material in the container 1.

One other method of providing a suitable penetration of the material with outlets or ducts is shown in Figs. 6 and 7. Here the shape of the ducts or channels 27, produced in the material, is in form of a series of continuous lines crossing each other, disclosing in parts sections or columns of angular shaped blocks or prisms made by the piercing device 28 partly shown in Fig. 6.

From the foregoing it is apparent, that my invention provides an efficient and comparatively simple method or plan of procedure for vacuumizing powdered material substantially throughout its bulk and for treating its mass and admitting to its interior a selected gas for preserving purposes or any other suitable intent.

These new features shown and described are set forth in the appended claims, it being understood, that I do not restrict myself to the way and arrangement shown when making practical use of my invention.

What I claim and desire to secure by Letters Patent is:

1. The method of vacuumizing powdered material which comprises providing the material with passages for the flow of gases from within the interior of the material to and through said passages and thereafter vacuumizing the material.

2. The method of treating powdered material which comprises providing the material with passages for the flow of gases from within the interior of the material to and through said passages, vacuumizing the material and thereafter sealing the same in its vacuumized condition in a container.

3. The method of packing and vacuumizing powdered material which comprises filling the powdered material into a container, compacting the powdered material, providing passages in the compacted material for the flow of gases from within the bulk of the material and thereafter vacuumizing the material.

4. The method of packing, vacuumizing and sealing powdered material in containers which comprises filling the powdered material into a container, providing passages in the material for the flow of gases from within the bulk of the material to and through said passages, withdrawing gases from the passages and the material, sealing the container airtight for maintaining the material in a vacuumized condition and thereafter shaking the sealed container for obliterating the passages produced in the material.

5. The method of treating powdered material which comprises providing passages in the material for the flow of gases therethrough and from and to the bulk of the material, vacuumizing the material and its passages and admitting thereafter a selected gas into the passages and the material.

6. The method of claim 5 in which the steps of vacuumizing the material and admitting a selected gas to the material are repeated a plurality of times.

7. The method of treating material in powdered form which comprises providing passages in the material for the flow of gases therethrough and from and to the bulk of the material, vacuumizing the material and its passages and admitting

thereafter a selected gas into the passages and the material, and thereafter hermetically sealing the material in its treated condition in a container.

8. The method of treating powdered material which comprises filling the powdered material into a container, providing passages in the material for the flow of gases therethrough and from and to the bulk of the material, vacuumizing the ma-

terial and its passages and admitting thereafter a selected gas into the passages and the material, sealing the material airtight in its treated condition in said container and thereafter shaking the sealed container until the passages produced in the material are substantially destroyed. 5

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