

UNITED STATES PATENT OFFICE

1,940,601

VENT PLUG

Harold E. McCrery and Albert E. Jesser,
Apollo, Pa.Application August 13, 1930, Serial No. 475,093
Renewed October 27, 1933

2 Claims. (Cl. 220-44)

This invention relates to vent-plugs for shipping containers.

In the shipment of many commodities such as molasses, lacquer compounds, etc., in steel drums and similar containers, the drums frequently are permitted to stand in the sun or in other places where the temperature is materially higher than the temperature of the material in the drum when the drum is filled. Under such conditions, the material in the drum expands, and when the drum is completely sealed, the head of the drum is apt to blow off since no provision is made for the expansion of the material in the drum.

An important object of the present invention is to provide a novel vent-plug for drums which is adapted to permit the escape of air from the drums to accommodate the expansion of the material in the drum.

A further object is to provide novel means for permitting the escape of air to accommodate the expansion of viscous or semi-liquid materials in a container without permitting the escape of the material itself.

A further object is to provide a vent plug of the character referred to which embodies the use of a foraminous material of such character as to permit the escape of air to accommodate for the expansion and contraction of material in the container without permitting the escape of the material itself.

A further object is to provide a vent plug of the character referred to which is adapted to exclude dust and other foreign material and water from finding its way into a shipping container.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the drawing we have shown several embodiments of the invention. In this showing, Figure 1 is a fragmentary vertical sectional view through the upper end of a shipping drum, parts being broken away.

Figure 2 is a section on line 2-2 of Figure 1, and,

Figure 3 is a detail view of a modified form of plug.

Referring to Figures 1 and 2, the numeral 10 designates the body of a shipping drum connected by an upstanding seam 11 to one of the heads 12. The head is provided with an internally threaded ring 13 adapted to receive a bung plug to be referred to in detail. The elements described are standard in construction and form no part of the present invention. In connection

with these elements, however, it will be noted that the seam 11 projects upwardly a substantial distance above the head 12, thus providing a space in which water collects when the drum is left outdoors in the rain, and it is important that water be prevented from finding its ways into the drum.

A plug indicated as a whole by the numeral 14 is threaded into the flange 13. As shown, the plug is provided with a depending skirt portion 15 forming a relatively large recess 16, the top of which is defined by a wall 17 forming the bottom of the body of the plug. The plug is provided with an outstanding flange 18 seating upon the upper end of the flange 13, and the plug is further provided with a polygonal portion 19, preferably hexagonal in shape, as shown in Figure 2, whereby the plug may be engaged by a wrench to turn it down tightly against the flange 13.

Referring to Figure 1, the numeral 20 designates an axial recess formed in the top of the plug 14 and communicating with the recess 16 through an opening 21. A plurality of layers of material 22 is illustrated as being arranged in the bottom of the recess 20. The material employed and the number of layers of the material will depend upon the material being shipped in the drum. For example, for the shipment of molasses, it is preferred that about six layers of canton flannel, napped on one side, be employed while in some cases, a fine mesh wire cloth, or several layers of such cloth may be used.

A ring or washer 23 seats upon the upper layer of the screen fabric and is held in place by the lower end of a plug 24. This plug is threaded in the upper end of the recess 20, as shown in Figure 1. The auxiliary plug 24 is provided with an internal recess 25, and the plug is further provided with a polygonal axial extension 26 for engagement with a suitable wrench. The projection 26 is drilled to provide a plurality of radial passages 27 communicating with the recess 25, as shown in Figures 1 and 2.

The modified form of plug illustrated in Figure 3 is identical with the form previously described, except for the particular screening element employed, and need not be referred to in detail. In Figure 3, the plug has been illustrated as being provided with a flexible rubber or similar disk 28 pierced at a number of points by a needle-like instrument to provide openings 29 which are normally closed. This form of the invention has been found particularly satisfactory

for the shipment of special lacquer compounds and the like.

The operation of the device is as follows:

Assuming that the drum is to be filled with molasses, the drum is filled in the usual way, whereupon the plug 14 is inserted and turned down tightly against the flange 13. The auxiliary plug 24 may be inserted in operative position either before or after the application of the plug 14, as will be apparent. The recess 16 is of substantial size and forms an expansion chamber when the temperature of the molasses rises. Obviously the drum is not completely filled with the molasses, and the small air space between the surface of the molasses and the head 12, together with the chamber 16, forms an ample expansion space for the molasses. When such expansion takes place, air will be expelled upwardly through the opening 21, through the fabric 22, and thus to the atmosphere through the chamber 26 and vent openings 27. The operation obviously will be reversed upon contraction of the material, thus permitting air to flow into the drum and prevent the creation of a parallel vacuum therein.

In practice, the drum preferably is provided with one of the devices in the head of the drum and in the side, and when the drum stands on end, the escape of air takes place through the vent plug in the head of the drum. It has been found that no escape of the liquid will take place through the vent plug in the side of the drum, since such escape is prevented by the viscosity of the molasses. When the drum stands on its side the side vent is rolled to the top of the drum to permit the escape of air upon the expansion of the molasses and the escape of the molasses through the vent plug in the head will be prevented by the viscosity of the material which prevents it from flowing through the screening element. Thus it will be apparent that the drum readily may be handled in any manner without the escape of material therefrom, but expansion and contraction of the material will be permitted to take place freely when the drum is in either of the normal positions referred to.

As previously stated, the fabric disks 22 may be formed either of cloth, and particularly canton flannel, or they may be formed of fine mesh wire cloth, the material and the number of layers thereof depending upon the nature of the material in the drum. Either cloth or wire fabric, however, will not seal the drum to the atmosphere, and such sealing is important when the container is employed for shipping materials such as lacquers which oxidize readily in the presence of air.

For the reason stated, the form of the device illustrated in Figure 3 is preferred when the container is used for shipping lacquers and other oxidizable materials. The rubber disk 28 is pierced in a number of places with a needle-like instrument, and each opening 29 closes upon the withdrawal of the instrument referred to. Under normal conditions therefore, material in a drum provided with the form of the device shown in Figure 3 will be sealed from the action of the atmosphere. Upon the expansion of the material, however, pressure will be created in the drum which will flex the rubber disk upwardly to permit air to escape through the openings 29.

It will be apparent that the device is extremely simple in construction and operation and does not require the provision of valves or other means

for preventing the escape of the material in the drum. In practice it has been found that the device is efficient for permitting the expansion and contraction of viscous liquids such as those referred to, but operates to prevent the escape of the material itself.

Some of the materials which may be shipped in the drum are subject to the vaporization of one or more of their constituents, and the chambers 16 and 26 form condensation chambers for the vapors arising from the material in the drum. In this connection it will be noted that the materials tend to drain downwardly along the sides of the chamber 25, thus preventing the vent openings 27 from becoming clogged.

As previously stated, the device is particularly adapted for use with metal shipping drums, although it obviously is not limited to such application, but may be used with shipping containers of other kinds. It will be noted that the vent openings 27 of the auxiliary plug associated with the head of the drum are arranged above the upper limit of the seam 11. As previously stated, water sometimes collects on the head of the drum, and the arrangement of the vent openings 27 above the seam 11 prevents water from draining into the chamber 25. The arrangement of the vent openings 27 also prevents the screening members from being accidentally or maliciously punctured. It is preferred that a number of relatively small vent openings be employed to minimize the passage of solid foreign material into the chamber 25.

It is to be understood that the forms of the invention herewith shown and described are to be taken as preferred examples of the same and that various changes in the shapes, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

We claim:

1. The combination with a container, of a main plug threaded in one wall of the container and divided intermediate its upper and lower ends by an integral wall, said main plug being provided in its upper and lower faces with relatively large recesses the lower of which communicates with the interior of the container, said wall having a relatively small opening there-through, a member arranged in said upper recess against said wall and having openings there-through sufficiently small to prevent the passage of material from the container but adapted to permit the passage of air to and from the container upon the expansion and contraction of the material in the container, and an auxiliary plug threaded in said upper recess and operative for retaining said member in position, said auxiliary plug being provided in its lower end with a relatively large dome shaped internal recess open to said member, said auxiliary plug being further provided with radial vent openings communicating with said internal recess substantially at the top thereof.

2. A vent device for containers comprising a main plug threaded for reception in an opening in one wall of the container and provided with an integral wall intermediate its upper and lower ends, said main plug being provided above and below said wall with relatively large recesses the latter of which communicates with the interior of the container, said wall having a relatively small opening therethrough, a member arranged in said upper recess against said wall and having openings therethrough sufficiently small to pre-

vent the passage of material therethrough from the container but adapted to permit the passage of air to and from the container upon the expansion and contraction of the material therein, and an auxiliary plug threaded in said upper recess and operative for retaining said member in position, said auxiliary plug being provided in its lower end with a relatively large dome shaped internal recess open to said member, said auxiliary plug being further provided with a plurality of radial vent openings communicating with said internal recess substantially at the top thereof. 80

HAROLD E. McCRERY.
ALBERT E. JESSER.

10	85
15	90
20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150