

[54] **SEALING APPARATUS FOR GAS OR VAPOR CONTAINERS SUBJECTED TO ABOVE OR BELOW ATMOSPHERIC PRESSURES FOR PRODUCT WEBS TO BE CONTINUOUSLY TREATED**

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[51] Int. Cl. **F26b 25/00**

[58] Field of Search..... 34/15, 242; 68/5 E; 277/237 R, DIG. 7; 432/115

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ABSTRACT

A sealing means for a container which permits the entrance or exit of a web of material to be treated inside the container. Three cylindrical rolls are rotatably mounted in series in the opening of the container and three endless sealing strips of resilient material are pressed against the three rollers. The sealing strips each have two straight portions, each arranged parallel to the axis of the roll. Each sealing strip also has two circular portions near each end of its roll which join the ends of the straight portions. The web material is passed between the sealing strips and the surface of each of the rolls.

5 Claims, 3 Drawing Figures

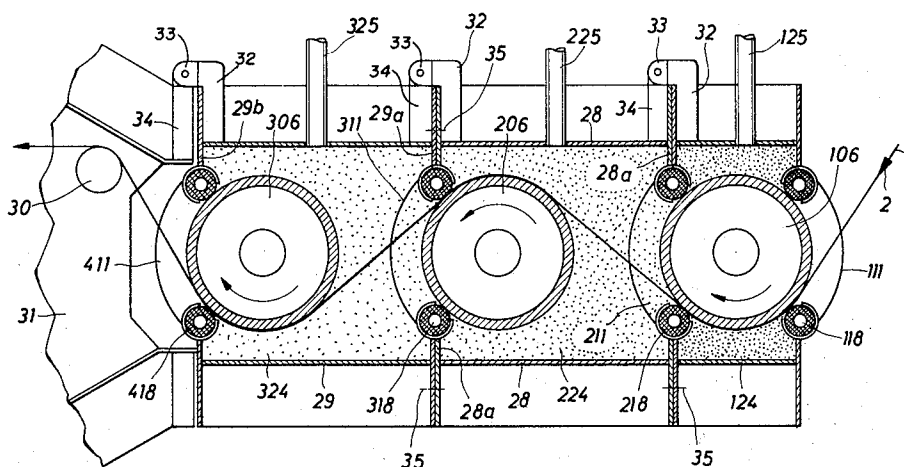


Fig.1

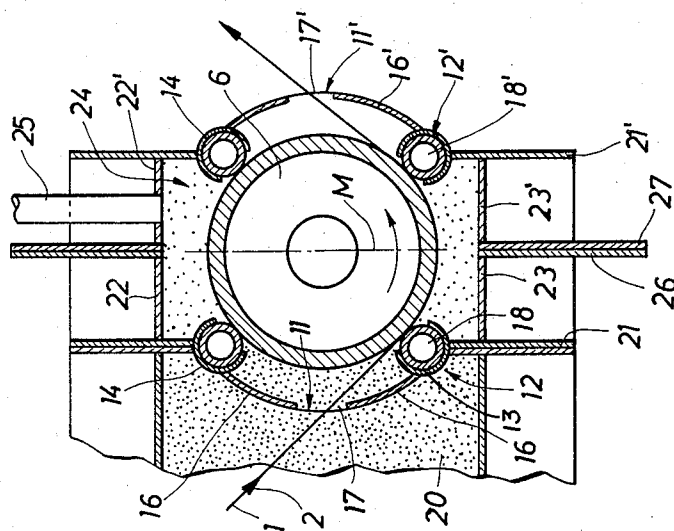
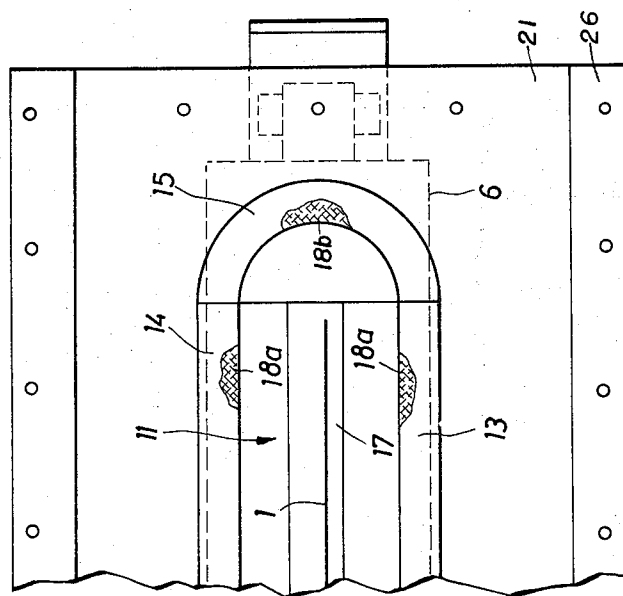


Fig.2



SEALING APPARATUS FOR GAS OR VAPOR CONTAINERS SUBJECTED TO ABOVE OR BELOW ATMOSPHERIC PRESSURES FOR PRODUCT WEBS TO BE CONTINUOUSLY TREATED

This invention relates to sealing apparatus for gas/vapor containers subjected to above or below atmospheric pressures for product webs to be continuously treated, in particular textile webs, including a pull roll arranged in direction of motion of the product web in front of or behind the container charging or discharging opening and a seal coacting therewith and engaging the product web. The seal is in the form of an endless elastic strip which is arranged at the edge of a longitudinal hood, the parallel sections of which are disposed in longitudinal direction of the roll and the arcuate sections of which connect said sections and engage the roll and the product web, respectively.

This invention makes use of a sealing device described in U.S. patent application Ser. No. 268,818 filed July 3, 1972. The foregoing application which is assigned to the same assignee as the present application, is incorporated by reference herein in its entirety.

SUMMARY

According to the invention, there is provided a sealing apparatus of the type initially specified, in which several hoods define the wall or portions of a wall of an intermediate chamber disposed between the treatment container and the atmospheric environment.

In this regard preferably two hoods can be arranged mirror-symmetrical relative to a roll center plane in defining the intermediate chamber in such a way that the two hoods define the charge and discharge opening of the intermediate chamber.

The intermediate chamber can be pressurized with a fluid or it can be evacuated and its contents heated or cooled. Preferably the intermediate chamber brings about a pressure step-down between the gas or vapor container and atmosphere, so that on the one hand an essential sealing of the treatment container is provided, on the other hand there is the possibility of subjecting the product web to a differentiated further treatment in its course from the treatment container to the atmospheric environment.

Also, several intermediate chambers can be arranged between the treatment container and the atmospheric environment, the bulkheads of which are provided with hoods disposed parallel to one another or are defined by such. In this regard, each of the intermediate chambers can be evacuated or cooled, pressure-differentiated or pressurized with different fluids in a manner different from the adjacent chambers.

Further features of the invention are disclosed in the description to follow and in the drawings, in which embodiments of the apparatus according to the invention have been illustrated.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a cross sectional view of one of the sealing means taken along a transverse plane.

FIG. 2 is a partial side view of one of the sealing means showing one of the end portions.

FIG. 3 is a cross sectional view of three sealing means joined in series between the container and the atmosphere.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIGS. 1 and 2, the product web 1 passes in the direction of the arrow 2 from a gas or vapor treatment container 20 into a hood 11 curved in cross section, the edge 12 of which has the two straight sections 13, 14 and two arcuate side sections 15, of which in FIG. 2 only the right-hand section has been shown. The shield 16 of the kidney-shaped hood 11 is interrupted at 17 along a length in such a way that the product web can be fed into the hood 11 in direction of the arrow 2 in the illustrated manner. The hood edge 12 with the straight sections 13, 14 and the arcuate sections 15 have a hub-like configuration and accommodates the endless, elastic seal strip 18 which defines a closed space curve with its straight sections 18a and its arcuate sections 18b (only the right-hand one of which is disclosed in FIG. 2), said space curve extending in such a way that the endless seal strip 18 engages the pull roll 6 before the product web 1 is drawn in between the straight section 18a of the elastic seal strip 18 and the pull roll 6.

In a mirror-symmetrical arrangement relative to the vertical central plane M of the pull roll 6 a similar hood 11' is provided on the side remote from the hood 11, said hood 11' having an edge 12' with a seal strip 18' and shield 16' with an opening 17'. The product web 1 is drawn from the roll 6 through this hood, after it has been looped around the roll 6 between the two straight sections (the lower ones in FIG. 1) of the two seal strips 18, 18'.

Each of the two hoods 11, 11' is provided with a frame plate 21, 21', which confine walls 22, 22' and 23, 23' as well as the roll 6, the interior of an intermediate chamber 24 relative to the treatment container 20 and the atmospheric environment disposed adjacent the hood 11' on the right-hand side in FIG. 1. The space of the intermediate chamber 24 defined above and below the roll 6 as well as lateral of the hood 11, 11' can be in communication through a line 25 with a further container, by which an intermediate pressure between the pressure in the container 20 and atmosphere is produced in the intermediate chamber 24, and the intermediate chamber 24, on the other hand, can also be evacuated or its contents can be cooled or heated or can be treated in some other way.

The two plates 21, 21' including the walls 22, 23 and 22', 23' can define the half of the wall of the intermediate chamber 24 each by means of further walls 26, 27, so that the assembly of the intermediate chamber can readily be effected with the two hoods 11, 11'.

In the embodiment according to FIG. 3 the product web 1 passes in direction of the arrow 2 to a first hood 111 with a seal strip 118, in order to partially be looped around the roll 106 and passed into a second hood 211, which confines a further intermediate chamber 224 with its seal strip 218, the confining walls 28 and 28a as well as the seal strip 318 of a third hood 311, a second pull roll 206 being arranged in said further intermediate chamber. The product web is discharged from the hood 311 into a third intermediate chamber 324, which is confined by the seal strip 318, the walls 29, 29a and 29b and the seal strip 418 of a further hood 411. In the chamber 324, a third pull roll 306 is provided. Finally, the product web is drawn into a treatment container 31 from the hood 411 via a roll 30.

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The chambers 124, 224, 324 are connected through conduits 125, 225, 325 with further containers so that different pressures can be produced in the intermediate chambers 124, 224, 324, different fluids can be introduced and a different evacuation or cooling can be effected.

Each of the chambers 124, 224, 324 is attached to its adjacent chamber by a hinge, each chamber having an arm 32 which is connected to an arm 34 of the adjacent chamber through a hinge 33. The bulkheads of the adjacent chambers can be releasably connected to one another by screw connections 35.

The embodiments of the invention, in which an exclusive property or privilege is claimed, are defined as follows:

1. A sealing system for fluid containers subjected to pressures, differing from atmospheric pressures, said system arranged for the entrance and exit of textile webs; including a pull roll for movement of the web and a seal coacting with the pull roll for engaging the web, said seal being in the form of an endless elastic strip having longitudinal portions parallel to the roll axis and

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arcuate portions connecting the longitudinal portions; the improvement comprising the use of a plurality of said sealing rolls connected in series array, each sealed from the others by a compartment and each compartment connected to a conduit for the application of external pressure.

2. A sealing system as claimed in claim 1 wherein each of said plural sealing compartments is connected to its adjoining compartment by means of a hinge.

3. A sealing system as claimed in claim 1 wherein each of the pull rolls rotates at the same speed, each engaging the web in succession.

4. A sealing system as claimed in claim 1 wherein each of the compartments is connected to a conduit through which a fluid may be applied to alter the temperature of the pull rolls and the web.

5. A sealing system as claimed in claim 1 wherein each of said plural compartments is connected by a conduit to a system which provides graduated pressures in steps ranging from the container pressure to the atmospheric pressure.

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