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METHOD AND APPARATUS FOR SEALING VACUUM PACK BAG

Original Filed June 11, 1958 2 Sheets-Sheet 1

FIG. 1

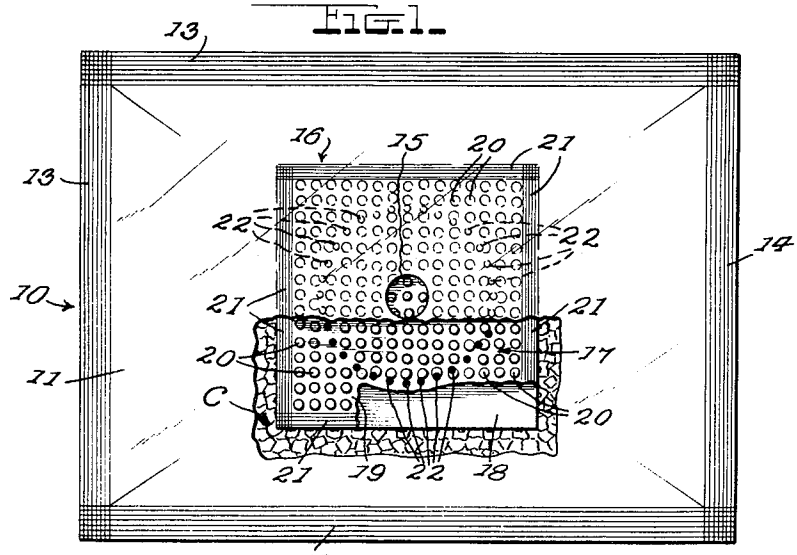

FIG. 2

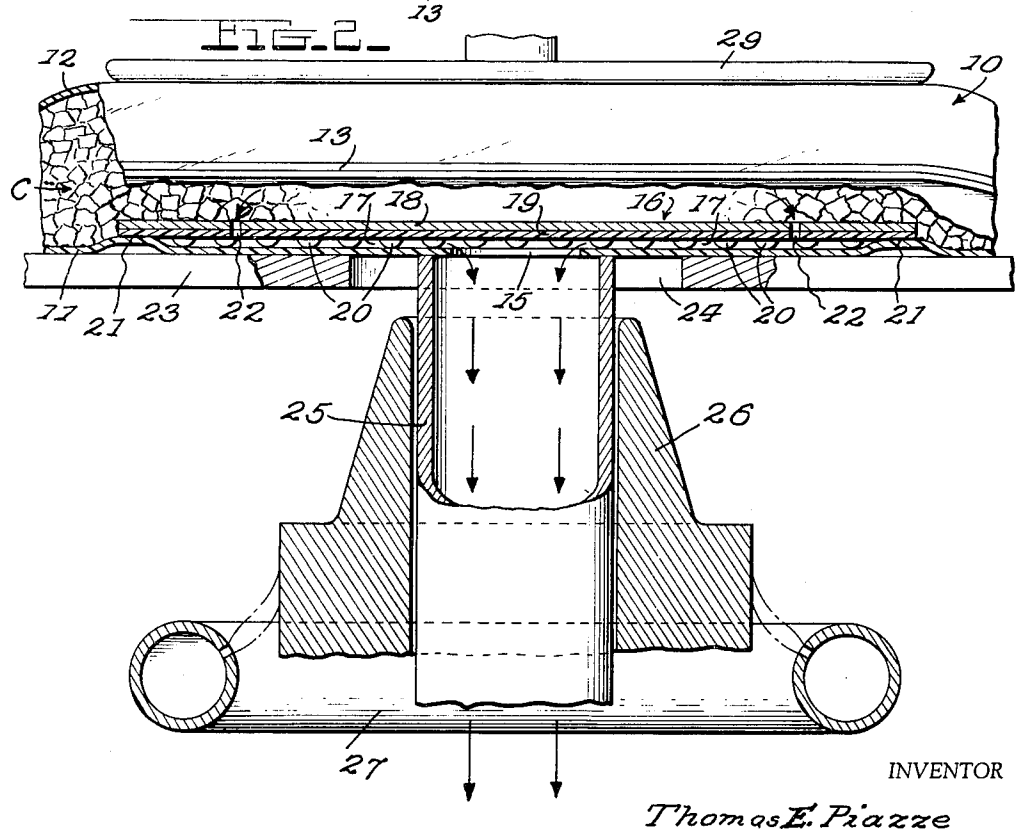

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FIG. 3

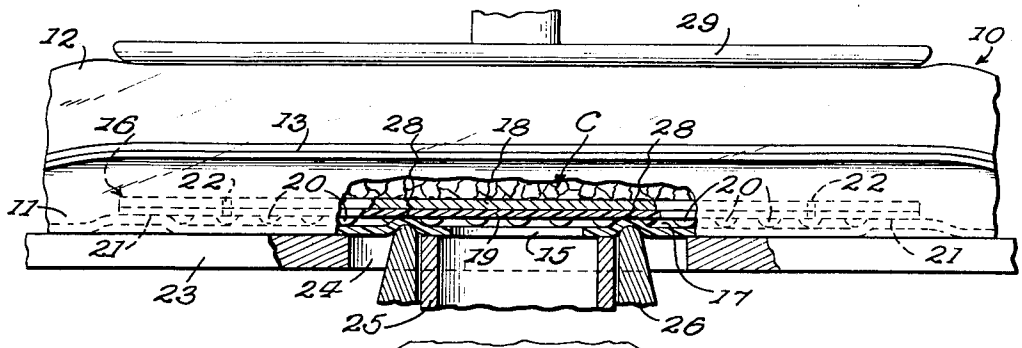


FIG. 4

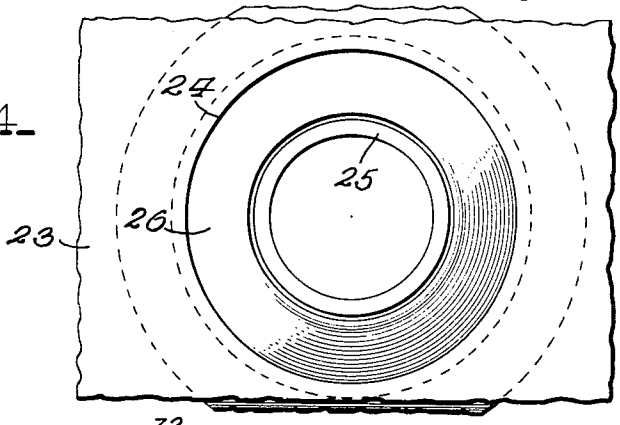
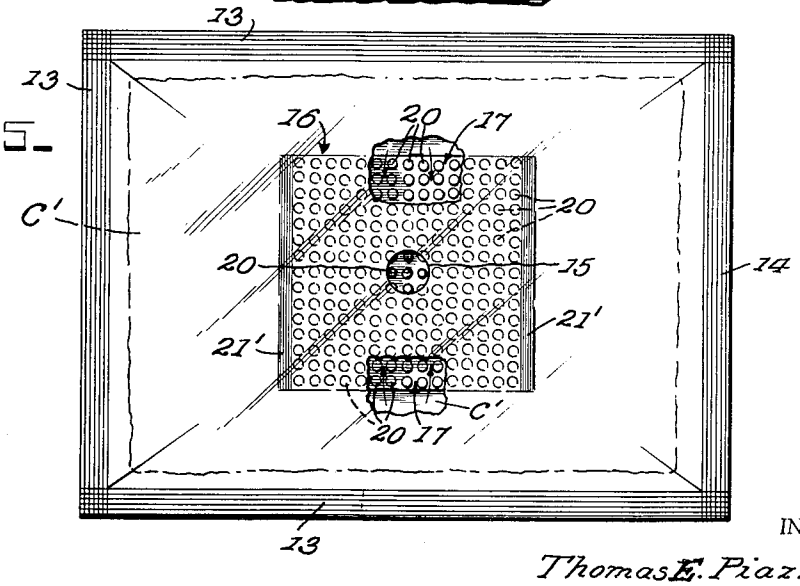


FIG. 5



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3,216,172
METHOD AND APPARATUS FOR SEALING VACUUM PACK BAG

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Original application June 11, 1958, Ser. No. 741,370, now Patent No. 3,086,693, dated Apr. 23, 1963. Divided and this application Aug. 10, 1962, Ser. No. 216,219

3 Claims. (Cl. 53—22)

This application is a division of my copending application Serial No. 741,370, filed June 11, 1958, now Patent No. 3,086,693 granted April 23, 1963.

In the packaging of cheeses, meats, coffee and various other commodities, it is quite common to vacuum-pack them in sealed bags of polyethylene or other heat-sealable plastic, but difficulties have been experienced in vacuumizing the filled bags and then tightly sealing them against re-entrance of air.

It has been proposed to provide one wall of the bag with an air-evacuating opening for communication with an air evacuating member, to provide an internal flexible patch extending over said opening and spaced from said bag wall to form an air-evacuating passage communicating with said opening and with the bag interior, and to heat-seal said patch to said wall around said opening after evacuation of air from the bag. However, unless the bag contents so smoothly and uniformly contact with the flexible patch as to prevent distortion of this patch during performance of the heat-sealing operation, there is danger of producing a faulty seal. Also, when vacuum-packaging a rather finely granulated or a powdered material, there has been liability of some of such material becoming entrained with the outgoing air and becoming deposited on the opposed surfaces of the bag wall and patch which are to be heat-sealed together: and such deposits have interfered with the production of a perfect seal.

The present invention has aimed to overcome the above mentioned difficulties.

In carrying out the above end, a specific object has been to provide an improved patch comprising a relatively stiff backing sheet and a film of heat-sealable material secured to the side of said backing sheet which faces the bag wall having the air-evacuating opening. The relatively stiff backing sheet is exposed to the bag contents and therefore, even if such contents do not contact smoothly and uniformly with the patch, appreciable patch distortion will be prevented. Consequently, when a heated sealing member is pressed against the bag wall to seal it to the patch film, said bag wall and film will become tightly clamped between the relatively stiff patch backing and said sealing member, and a perfect seal will be produced.

Another specific object has been to seal all edges of the patch to the bag wall and to admit air to the evacuating passage between the patch and the bag wall, only through perforations in the patch. Thus, by forming these perforations so fine that particles of granulated or powdered bag contents cannot pass through them, such particles will be excluded from the opposed surfaces of said patch and bag wall and cannot interfere with heat sealing.

Further objects have been to provide a novel and advantageous method and a novel and advantageous apparatus for evacuating the air and then sealing the bag against re-entrance of air.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a side elevation, partly broken away, showing a bag having a perforated patch, the bag being filled with granular material and in readiness for the evacuation of air through the perforations in the patch.

FIGURE 2 is a vertical sectional view, partly in elevation, showing the filled bag engaged with the air-evacuating and heat-sealing apparatus, the evacuation of air being indicated by arrows.

FIGURE 3 is a view similar to FIGURE 2 but showing the heated sealing ring of the apparatus in the act of sealing together the portions of the bag walls and patch around the air-evacuating opening and between this opening and the patch perforations.

FIGURE 4 is a fragmentary top view showing the bag support, the air-evacuating member and the heat-sealing ring.

FIGURE 5 is a view similar to FIGURE 1 but showing a construction which may be employed when there is no danger of any particles of the bag contents entering between the patch and the bag wall.

The bag **10** shown in the drawings is constructed from two sheets **11** and **12** of plastic heat-sealable stock, three edges of said sheets being heat-sealed together at the factory, as indicated at **13**, leaving the bag open at one end for filling. The open end is to be heat-sealed at **14**, after filling. This type of bag has been shown for illustrative purposes only and other known bag structures could be employed if desired.

The sheet **11** forms one side wall of the bag and is formed with an air-evacuating opening **15**. Within the bag is a patch **16** which extends across the opening **15** and is secured to the bag wall **11**. Provision is made for spacing the patch **16** from the wall **11** to provide an air-evacuating passage **17** between them, said passage being in communiaction with the opening **15** and with the bag interior.

In each form of the invention, the patch **16** is of composite form and comprises a relatively stiff backing sheet **18** and a film **19** secured to the side of the backing sheet **18** which faces the bag wall **11**. The relatively stiff backing sheet **18** may be formed from cardboard or other appropriate material having required stiffness to prevent patch distortion during sealing around the opening **15**. The film **19** is of heat-sealable material, for example polyethylene, and it may be cemented to or otherwise united with the relatively stiff backing sheet **18**, or it may be formed by a layer of heat-sealable cement applied to said backing sheet. In either instance, the film **19** preferably has a multiplicity of suitable projections **20** which space the patch **16** from the bag wall **11** to provide the passage **17**. However, this bag wall **11** could well be provided with equivalent spacing projections, if desired.

In FIGURES 1 to 3, all edges of the patch **16** are heat-sealed to the bag wall **11** as indicated at **21** and the passage **17** communicates with the bag interior only through perforations **22**. These perforations **22** may be of any desired shape and they are all radially spaced from the opening **15**. While they are shown as disposed in a circular series, this is not essential. All air being evacuated from the bag (see FIGURE 2) flows through the perforations **22** to the passage **17** to and through the opening **15**. Therefore, by forming the perforations **22** sufficiently small to prevent granular or powdered bag contents C from passing through them, particles of such contents cannot become deposited on the opposed surfaces of the patch film **19** and the bag wall **11** and cannot therefore interfere with heat sealing of these elements together after air evacuation.

When the bag contents are to be such that there is no danger of any particles thereof entering the passage **17**, all edges of the composite patch **16** need not be sealed to the bag wall **11** and said patch need not have

the perforations **22**. Such a construction is shown in FIGURE 5 and the contents are indicated at C'. In this view, two edges of the patch **16** are shown heat-sealed at **21'** to the bag wall **11**. The heat sealing **21'** is shown in stripe form but could well be at intervals only.

The apparatus disclosed in FIGURES 2, 3 and 4 is preferably employed in effecting air evacuation from the bag and in then sealing the latter against re-entrance of air. In these views a horizontal table **23** is shown, upon which to lay the filled bag. This table **23** has an opening **24** into which the upper end of an air-evacuating pipe **25** extends, the table and pipe being fixedly mounted in any suitable way. The upper extremity of the pipe **25** is preferably in the same plane with the top of the table **23**, is open, and is of a diameter less than that of the table opening **24** but greater than that of the bag opening **15**. A normally lowered sealing ring **26** surrounds the pipe **25** and may be raised by any suitable means. This ring **26** is heated by flame from a burner **27**, or in any other suitable manner, to a temperature at which it may be utilized to heat-seal the bag wall **11** to the patch film **19** after evacuation of air from the bag **10**.

The filled bag is laid upon the table **23** as seen in FIGURE 2, with its side wall **11** resting on the upper end of the pipe **25** and with the opening **15** communicating with said pipe. Then by any adequate pump means, partial vacuum is created in the pipe **25**. This causes the bag-contained air to enter the passage **17**, flow through this passage to the opening **15** and flow through this opening to and through the pipe **25**. When the patch of FIGURES 1 to 3 is used, the air from the bag enters the passage **17** only through the perforations **22**. When the patch of FIGURE 5 is employed the air enters the passage **17** at the periphery of said patch. When the desired vacuumizing has been attained, the heated sealing ring **26** is raised as seen in FIGURE 3. This causes tight clamping of the bag wall **11** and the patch film **19** between the sealing ring **25** and the stiff patch backing **18** and the heat from said sealing ring heat-seals said wall **11** and film **19** together as seen at **28**. As the patch backing **18** prevents distortion of the patch film **19**, even if the bag contents do not smoothly and uniformly contact with said backing, a perfect seal is assured. When the patch of FIGURES 1 to 3 is employed, the seal **28** is, of course, between the opening **15** and the perforations **22**. Regardless of which form of patch is used, the projections **20** in the zone of the seal **28** do not interfere with the formation of said seal, as they become sufficiently fluid to flatten out into the plane of the film **19**.

During the air-evacuating and heat-sealing operations, a bag hold-down plate **29** may be employed if the weight of the bag contents be insufficient to properly hold the bag down when the sealing ring **26** is raised.

From the foregoing, it will be seen that novel and advantageous provision has been disclosed for attaining the desired ends. However, variations may well be made

within the scope of the invention as claimed, and it is to be understood that the invention is not restricted to a bag but is adaptable also to other forms of containers, whether flexible throughout or flexible only at the wall portion which is to be sealed to the patch.

I claim:

1. A method of sealing a flexible heat-sealable wall of a container to an internal heat-sealable patch which extends over an air-evacuating opening in said wall and provides an air-evacuating passage between said opening and the interior of said container, the steps of placing said wall against an air-evacuating member with said air-evacuating opening in communication with said air-evacuating member, exhausting air through said opening and said air-evacuating passage and thereby evacuating air from the interior of the container, applying a heated sealing member against the outer side of said wall around the air-evacuating member before terminating the evacuation of air from the container, and moving the heated sealing member against the wall to press the wall against said patch to seal said wall and patch together and close fluid communication between the interior of the container and the opening through the air-evacuating passage.

2. The method defined in claim **1** including the additional step of spacing the portion of the patch overlying the opening during the evacuation of the interior of said container to prevent the patch from being drawn against portions of the wall adjacent the opening prior to complete evacuation of the container interior whereby complete evacuation of the container is assured.

3. An apparatus for evacuating air from a filled container having a heat-sealable wall formed with an air-evacuating opening, and an internal heat-sealable patch extending over said opening; said apparatus comprising a table upon which to lay the filled container with its air-evacuating opening disposed downwardly, said table having an opening to downwardly expose an area of the bag wall around said air-evacuating opening, an air-evacuating member having an open upper end to abut the exterior of said container wall around said air-evacuating opening, said upper end of said air-evacuating member being received within said opening of said table but being spaced from the wall of this opening, a sealing ring surrounding said air-evacuating member and raisable into said opening of said table to seal said container wall to said patch, and means for heating said sealing ring.

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