Jan. 16, 1968 R. G. KING 3,363,395

SUCTION PACKAGING APPARATUS

Original Filed Dec. 21, 1961 2 Sheets-Sheet 1

Fig. 1

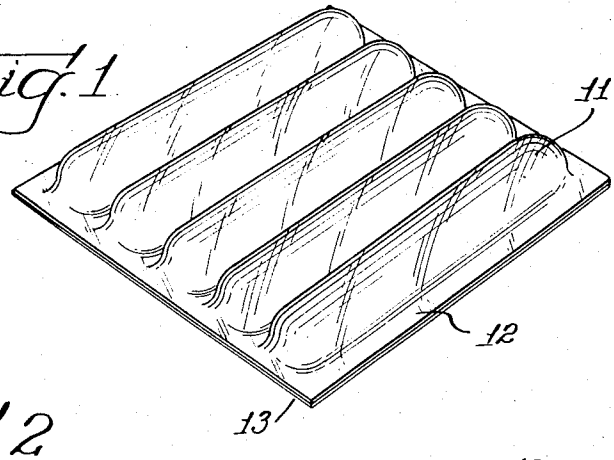


Fig. 2

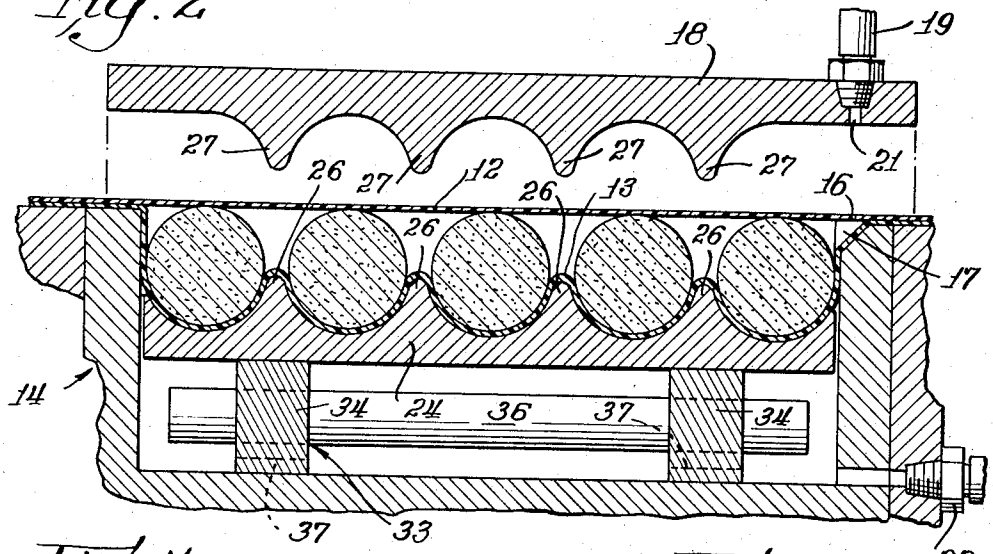


Fig. 4

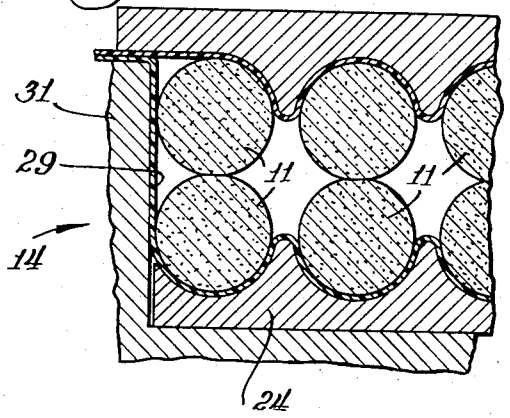
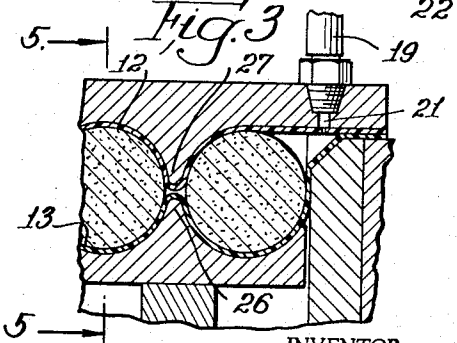


Fig. 3



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Fig. 5.

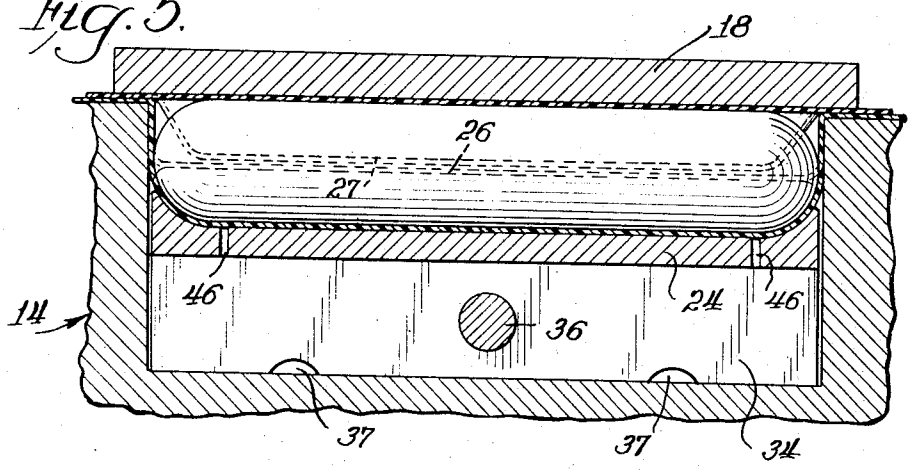


Fig. 6.

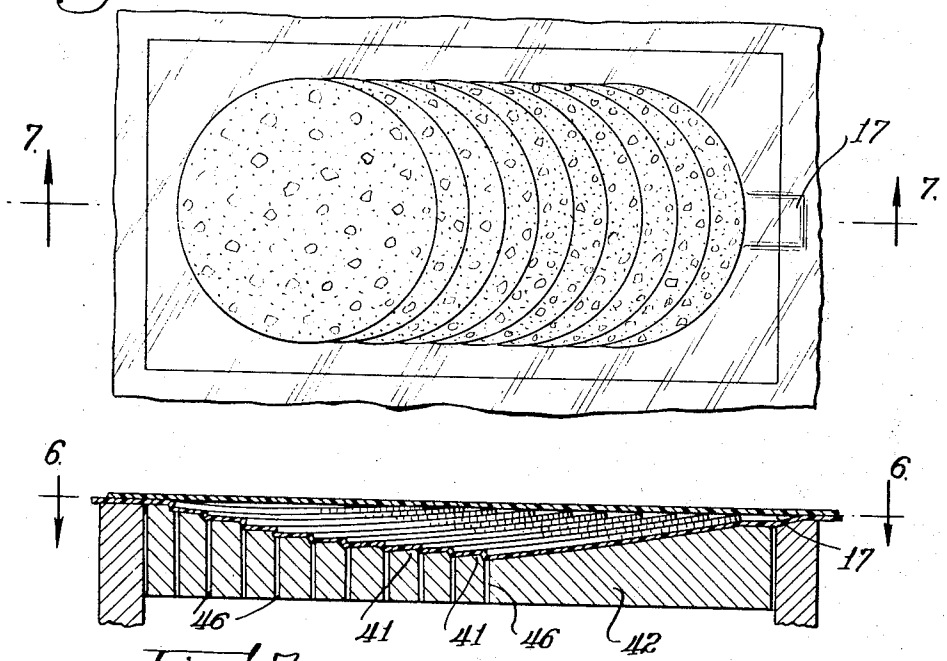


Fig. 7.

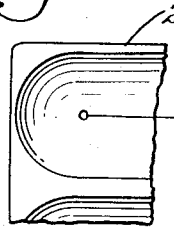


Fig. 5a

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3,363,395

SUCTION PACKAGING APPARATUS

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Original application Dec. 21, 1961, Ser. No. 161,061, now Patent No. 3,216,832, dated Nov. 9, 1965. Divided and this application Feb. 19, 1965, Ser. No. 434,069

1 Claim. (Cl. 53—112)

The present application is a division of application Ser. No. 161,061 filed Dec. 21, 1961, now Patent No. 3,216,832.

In the field of stretch wrapping, or packaging products in film, it is sometimes desirable to suck air out of the package after it is initially formed, and then seal the package so that the product is protected from contact with air. Machines for performing such suction packaging have been satisfactorily built and operated before the present invention.

According to the present invention, a method of packaging is developed by which such machines are made more efficient and more satisfactory for some products of irregular shape, typified by a plurality of sausages. This is accomplished by premolding the package-forming films to the irregular shape of such products. By premolding the film to substantially its desired shape before evacuation thereof is commenced there is less interstitial space from which the air must be drawn, and more certainty of adequate evacuation. In the illustrated apparatus for performing my method, and which also embodies my invention, the premolding of the film is accomplished by providing ribs along the previously smooth mold surfaces, these ribs conforming to the shape of the product to be packaged.

This contour premolding increases efficiency in reducing the amount of power required for pumping. It also makes possible the allowance of less time for the evacuating of the package and therefore a speeding up of the packaging process.

It also results in better keeping qualities. It should be understood that with respect to many products, as for example, many foods, one of the reasons for the removal of air from the package is to improve the keeping qualities of the product. Often the oxygen in the atmosphere has a deleterious effect upon the product. In the past it has been assumed that an effective job of oxygen removal has been accomplished in vacuum packaging when the films of the finished package appeared to have been satisfactorily drawn into contact with the surfaces of the product. According to the present invention, however, it has been recognized that this is not always true with irregularly shaped articles; and the preshaping method of this invention gives adequate evacuation more reliably. It also facilitates separating the items within one package, when desired.

The present invention also results more reliably in the desired package attractiveness. It avoids wrinkles, which have previously occurred and avoids some instances of flattening of the product.

Additional objects and advantages of the invention will be apparent from the following description and from the drawings.

Designation of figures

FIGURE 1 is a perspective view of one form of the package which can be more efficiently produced according to the present invention.

FIGURE 2 is a vertical sectional view through a mold embodying the present invention for producing the package of FIG. 1.

FIGURE 3 is a fragmentary view similar to FIG. 2 showing the mold closed.

FIGURE 4 is a fragmentary view of the same mold with the bottom plate deeper in the mold to provide for two layers of the sausages or the like comprising the wrapped product.

FIGURE 5 is a vertical sectional view taken approximately about the line 5—5 of FIG. 3.

FIGURE 5A is a fragmentary view showing the contouring of the ends of the mold recesses in FIG. 5.

FIGURE 6 is a plan view of a mold contoured for a different article, with the article being packaged therein.

FIGURE 7 is a vertical sectional view taken approximately along the line 7—7 of FIG. 6, showing especially the cross section of the contoured bottom plate of the mold.

Intent clause

Although the following disclosure offered for public dissemination is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose, as it is these that meet the requirements of pointing out the parts, improvements or combinations in which the inventive concepts are found.

General description—background

The method of this invention is best explained by reference to its performance in specific apparatus. In many respects the apparatus may correspond to that shown in the Charles E. Cloud Patent 2,888,787. FIGURE 1 represents a type of package which might be formed on the machine of that patent, but which is better formed by the present method. In the illustration, the product comprises five frankfurters 11. They are packaged between two films 12 and 13 of stretch-wrap material which are sealed together peripherally. Air has been evacuated from the package to draw the film into snug engagement with the product.

Although FIGURE 2 includes features of the present invention, it also includes the basic features taught by the Cloud patent. Thus, a lower or base mold 14 forms a pocket into which the lower film 13 is drawn so that a pocket is also formed in it. After the product is placed in this pocket, the upper film 12 is sealed across it. A perforation 16 is formed in the upper film 12 in alignment with a venting notch 17 formed in the lower film by virtue of its following the contour of a similar notch in the mold 14. A cover plate 18 is now laid across the mold 14 sealing it off, and air from within the package, that is, from between the films 12 and 13, is drawn out through suction hose 19, passage 21, perforation 16 and notch 17. During this evacuation, the same high vacuum may be applied to base mold 14 through tube 22, which would have been used earlier with a lower vacuum for sucking the film 13 into the mold. After the air has been evacuated from the package, air is admitted through tube 22 to collapse the package and seal lower film 13 over perforation 16, thereby sealing the package against the readmission of air.

As illustrated in the patent, the bottom of the mold was flat and hence the lower film 13 was drawn to the shape of a flat-bottomed pocket. Likewise the cap plate 18 was flat on its inner side.

The Cloud type of machine worked very well on the types of product illustrated in that patent. On other types of product, the Cloud machine did not seem to work as perfectly.

Contour premolding

According to the present invention the causes of imperfections in operation of the Cloud machine with some

types of packages has been recognized, and a remedy for the trouble has been provided. The trouble arose from the fact that there were depressions in the outer surfaces of some types of products. In the finished product the film obviously had been drawn into these depressions by vacuum, and the cause of imperfections wasn't readily determined. Even after observing that sometimes the evacuation did not seem to be as good as desired, there was still a problem of how to make it better. According to the present invention, these causes have been determined to be mainly of three related natures.

(1) The depressions increased the amount of vacant space within the package from which air had to be withdrawn, and accordingly it increased the amount of air to be withdrawn. Time which was sufficient for withdrawing the air from other packages was not sufficient for withdrawing the air from these packages.

(2) Partly because of inadequate evacuation time, and partly for other reasons, the films did not contact the surfaces of the product as uniformly as in the case of more easily packaged articles, and the resulting exposure of air within the package caused more deterioration of the packaged product than was expected of the packages from the Cloud machine.

(3) If the application of external air pressure closed the evacuation package before completing the collapse of the package it would trap slightly more residual air within the package than would otherwise be the case.

According to the present invention, these causes of trouble are reduced or substantially eliminated by preshaping the film to conform to the depressions of the product, so that there is less space to be evacuated, so that the film more readily is drawn into contact with the product even in the area of the depressions, and so that less residual oxygen is enclosed.

As seen in FIGURE 2, the preshaping of the bottom film is performed by using a bottom mold plate **24** provided with upstanding ribs or ridges **26** to fit the depressions within the product, namely the spaces between the sausages. It is apparent from FIGURE 2 that the lower ribs **26** have preformed the film **13**, as it was drawn into the pocket, to approximately fit the lower surface of the product. Likewise, the top mold plate or cap **18** is provided with ribs **27** extending downwardly so that they also fit the depressions in the product or the spaces between the members of the product. As seen in FIGURE 3, the lowering of the cap **18** over the mold will preform the upper film **12** in the like manner.

It might seem, from FIGURE 2, that the sausages are spaced so far apart that there would be extra space between them to be evacuated instead of less. However, as seen in FIGURE 3, the fingers **26** and **27** press the respective films **12** and **13** almost into contact with one another. Hence, there is only a very minimum space, in the end, to be evacuated.

FIGURES 5 and 5A show other views of the structure in FIGURES 2 and 3, showing especially the partly spherical contouring of bottom plate **24** to correspond to the shape of the ends of the frankfurters. This is important, especially if the film is used which does not contract elastically, to avoid wrinkles due to excess areas of material.

According to another feature of the invention, the same contoured bottom plate **24** may be used for a single layer of sausages as in FIGURE 2, or for two layers of sausages as in FIGURE 4. In FIGURE 4, the contoured bottom plate **24** rests on the bottom of cavity **29** of base mold **14**. This provides a mold combination comprising contour bottom plate **24** and the side walls **31** of base mold **14**, suitable for two layers of sausages **11**. When only one layer of sausages is to be packaged, the bottom contour plate **24** is rested on a rack **33** of any suitable form which holds the contour bottom plate **24** at the right elevation for a single layer of sausages.

The rack **33** has been shown as formed of two bars **34** of the desired vertical dimension and held in proper relationship with one another by a dowel **36** which may have a press fit with the bars **34**. Flow of air pass the bars **34** may be ensured by grooves **37**. Since the bars fit loosely, these grooves probably are not needed, and frankly their purpose may be more to show in the drawing that there is communication past the bars **34** than because of real necessity for their use.

FIGURES 6 and 7 illustrate another shape with respect to which the contour mold concept of this invention is useful, even though it is not as easy to obtain good interfitting between the product and the contour of the mold as in the case of FIGURES 1 to 5. In FIGURE 6 the product is a spread-out stack of slices of food product such as cheese or meat. The spreading out is desirable for ease in separation of the slices as well as for attractiveness in the store. Nevertheless, such spreading out or lapping presents the problem of interstitial spaces from which air must be withdrawn. As illustrated in FIGURE 7, upstanding ribs **41** are provided to interfit with the contour of the sliced product to be packaged. Preferably in this case the ribs **41** are arcuate in shape, if the slices are round as seen in FIGURE 3. The cap for the mold shown in FIGURE 7 may be similarly provided with ribs, although these ribs would lie mainly to the right when the ribs **41** are mainly to the left.

It will be observed that in addition to having ribs **41**, the contour bottom plate **42** of FIGURE 7 is concave on its upper face and nonsymmetrical so as to fit the nonsymmetrical product.

Packagers often desire to have the individual products such as frankfurters sealed in isolation from one another. It might seem from FIGURE 3 that this would not result, but in fact the two films, when pressed close to one another by ribs **26** and **27**, will usually be pressed together by external air pressure when applied at the end of the evacuation. As a matter of fact, it has been found that this result can be achieved, even with a simplified version of the method in which the ribs **27** are omitted, and only the lower film is pre-contoured. In this event, however, it may be necessary to use ribs a little higher than the ribs **26** as shown so as to press the film to or even a little beyond the points at which the frankfurters are closest together. The height to which the lower film **13** will need to be pre-contoured will depend somewhat on the stretching characteristics of the films, and especially of upper film **12**.

Although this version of the method in which the upper film is not pre-contoured does not achieve the maximum advantages of the invention from the standpoint of minimizing the space to be evacuated and minimizing the residual air, it has been found to do a satisfactory job.

Even without pre-contouring the upper film, the pre-contouring of the lower film has proved to be extremely important. It makes a great difference in the finished package in some instances. For example, it is very difficult without it to achieve isolation of the frankfurters from one another. It is also difficult without at least this lower pre-contouring to avoid a flattening of the adjacent sides of the frankfurters as the collapsing process tends to squeeze them together.

Pre-contouring the bottom film makes it possible to keep the frankfurters separated and reliably avoid wrinkles in the film on that side of the sausages so that this side has an extremely attractive appearance and may well be the side chosen for display, even though the other side may not be noticeably inferior.

For proper pre-contouring it is necessary to be sure that the film is drawn fully into the mold. This may or may not result from the fact that the bottom plates **24** or **42** fit loosely in the main mold body as **14** so that air can be drawn around the edges of the bottom plates. If it is found that the film as it stretches seals off any of the pockets or recesses into which it is intended to be drawn, air passages **46** should be provided at critical

points. These also aid in quick collapsing of the film after evacuation.

The present invention is to be distinguished from packaging of the past in which the simplest possible shaping of the pocket happened to be the same as that of the product. Here there is special contour shaping of nonsymmetrical or irregular nature to closely fit a product (often a multipart product) which is of a nonsymmetrical shape or recessed.

Thus, in a typical performance of the method of this invention, a first film is stretched to define a pocket for receiving the product to be packaged. This pocket is contoured to the shaped of the unit(s) to be packaged and is provided with ridges which correspond in shape, size and position to the recesses on one side of the unit(s). The unit(s) are then positioned in the pocket with the recesses of the unit(s) in alignment with said ridges. A second film then is contoured to fit about the top of the unit(s) resting in the pocket. The films are provided with peripheral borders that can be sealed together to form the package. Only after at least one of the films has been contoured to the product therebetween is a vacuum applied to evacuate the interior of the package. Following this evacuation and collapsing of the package by external air pressure, the package is sealed to prevent the readmission of air.

I claim:

1. Apparatus for sealing in plastic, with a minimum of enclosed oxygen, a product of irregular shape having a plurality of recesses in the surface thereof and which is deleteriously affected by the presence of oxygen; said apparatus comprising a mold having a plurality of separable parts, said mold having internal walls defining an internal cavity of said irregular shape with spaced, raised wall portions corresponding to the recesses in the surface of the product and adapted to be inserted therein, the spaces between the raised wall portions forming depressions, a separate vacuum port for each of said depressions extending through said mold to a respective one of said depressions; said apparatus including means communicating with said internal cavity for evacuating air from within the package.

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