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S. H. BERCH

2,235,394

MEANS FOR VACUUM SEALING PACKAGES

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Fig. 1.

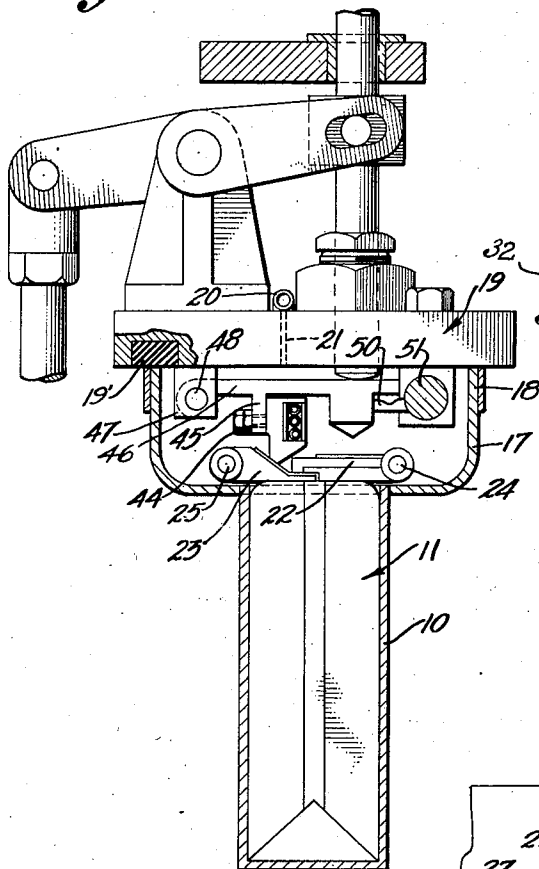


Fig. 4.

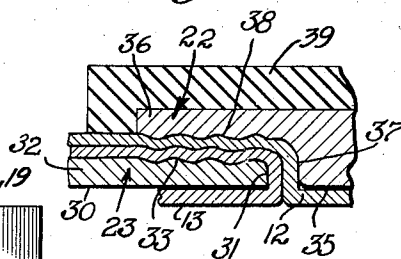


Fig. 3.

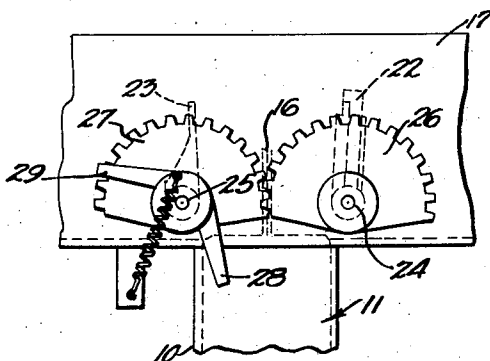
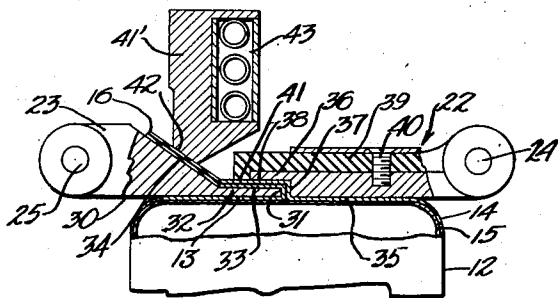


Fig. 2.



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MEANS FOR VACUUM SEALING PACKAGES

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6 Claims. (Cl. 93—6)

This invention relates to packaging machinery and particularly pertains to means for vacuum sealing packages and is a continuation in part of my application entitled "Method and means of packaging and vacuum sealing products," filed June 13, 1939, Serial No. 279,150.

In the packaging of various products within a bag-like container capable of maintaining a vacuum seal, as shown in my application of which this is a continuation in part, it is necessary to fill the container and thereafter exert suction action upon the container and its contents prior to forming a tight and permanent seal across the mouth of the filled container. When the product to be sealed within the container is finely divided material, such for example as ground coffee, considerable difficulty has been experienced in forming a tight seal and seam across the mouth of the bag since there is a tendency for the finely divided material to be drawn upwardly into the mouth of the bag by suction. An undesirable amount of this material may be trapped in the seam which is being formed. This causes an imperfect seam to be made and will prevent the package from being permanently vacuum sealed. It is the principal object of the present invention, therefore, to provide means whereby a flexible container may be filled with a finely divided product, thereafter subjected to vacuum action and then sealing the mouth of the container while holding the same in a manner to prevent the seepage of the granular product into the seam as it is being formed and sealed, whereby the package will be permanently vacuum sealed in an automatic mechanical operation.

The present invention contemplates the provision of a mold designed to receive a package to be vacuum sealed and over which mold a vacuum head is applied to exert a suitable suction action on the package and its contents, the structure including means for folding the mouth of the container and holding the mouth sufficiently tight to prevent finely divided material from being drawn between the abutting faces of the held portion while sealing the same.

The invention is illustrated by way of example in the accompanying drawing, in which:

Figure 1 is a view in vertical section and elevation showing a package mold, the vacuum head therefor and the seaming means of which the present invention is particularly concerned.

Fig. 2 is an enlarged fragmentary view showing the details of construction of the seaming means.

Fig. 3 is a view drawn on a reduced scale and indicating the manner in which the folding and seaming means is operated.

Fig. 4 is a fragmentary view indicating folding fingers adapted to form corrugations in the seam.

Referring more particularly to the drawing, 10 indicates a mold within which a package 11 is placed. The package 11 is formed with side walls 12 and 13 which may comprise an outer sheet of non-stretching material 14 and an inner sheet of stretching material 15. Such a structure is shown in my issued Patent No. 2,102,716. The inner sheet of stretchable material is preferably a rubber compound, such for example as "Plio-film." This material has the characteristic of being capable of heat sealing. The horizontal section of the mold 10 is substantially rectangular and the depth of the mold is such as to provide an upper length of the side walls 12 and 13 which extends above the level to which the package is filled. This mouth portion is indicated at 16 in the drawing. Mounted around the mouth of the mold 10 is a pan 17 which has a horizontal wall portion and a marginal flange which extends upwardly and is fitted with a lip 18 at its upper edge. A movable vacuum head 19 is provided to be positioned over the mouth of the pan 17 and to form a hermetical seal therewith. A suitable gasket 19' rests upon the lip 18 to provide this seal. A suction pipe 20 is carried by the head and communicates with the space in the mold through suction ducts 21. Mounted within the pan 17 and above the mold 10 are folding fingers 22 and 23. These fingers swing vertically and are carried upon pivot pins 24 and 25. Normally the folding fingers 22 and 23 stand vertically, as indicated in Fig. 3 of the drawing, and swing downwardly to their horizontally aligned position as shown in Figs. 1 and 2. The pins 24 and 25 of the fingers carry gear segments 26 and 27 which are in mesh with each other and insure that the folding fingers will move in unison in their operation. One of the pins is fitted with trip fingers 28 and 29 which may engage operating structures not shown in the drawing but by which the gear segments 26 and 27 may be rotated in alternate directions.

In my previously filed application the folding fingers 22 and 23 were indicated as being of metal. It was found in operation that when so constructed the meeting faces of the portion 16 of the package could not be held in sufficiently close contact to prevent the material within the package from being drawn upwardly into the

seam when subjected to suction action. In the present instance the fingers have been constructed in a manner to insure that the meeting edges of the package will not tend to slip and loosen when subjected to suction action, and that furthermore these edges will be held with sufficient force to prevent granular material from seeping into the seam to be formed while allowing the suction action to evacuate the container and permit it to then be sealed.

The construction of the folding fingers is particularly shown in Fig. 2 of the drawing. Here it will be seen that the finger 23 has a flat bottom face 30 which folds down upon the wall section 13 for a distance substantially one-half of the width of the package. The free end of the finger 23 is substantially square, as indicated at 31, and when in its folding position stands vertically. A relatively thin tongue or blade 32 is formed as a part of the finger adjacent the free end. This tongue has an upper face 33 substantially parallel to the lower face 30. An obliquely disposed sealing face 34 is formed on the back of the finger 23. The folding finger 22 has a face 35 which extends for a distance substantially halfway the width of the package 11, and when the fingers 22 and 23 are in their folding positions the faces 35 and 30, respectively, of these fingers will lie in a common horizontal plane. At the free end of the folding finger 23 there is a blade 36 which overhangs the blade portion 32 of the finger 23. A shoulder 37 is formed on the folding finger 22 beneath the blade and in the folded positions of the fingers stands parallel to the end face 31 of the finger 23. At this particular time these faces are spaced apart substantially the distance represented by the thickness of the wall sections 12 and 13 which are collapsed against each other to form the mouth portion 16. The blade portion 36 has a face 38 which is parallel to the face 35 and overhangs the blade 32. The spacing between the contiguous faces of the blades 32 and 36 is such as to insure that the mouth of the container will be fully collapsed and held in this position sufficiently tight to prevent large grains of finely divided material from the package to be drawn up into the seam to be formed at the mouth of the container. Overhanging the blade portion 36 of the folding finger 22 is a rubber blade 39 which is suitably secured to the folding finger 22, such as by the screw 40. The lower face 41 of the rubber blade 39 lies in substantially the same plane as the face 38 of the blade portion 36. Thus, when the finger 22 is down in its folded position it will compress the mouth portion of the package against the blade 32 of the folding finger 23. The rubber blade 39 will act to hold the abutting faces of the mouth portion 16 of the package firmly so that small particles of powder fineness will not be drawn into the seam, while permitting suction action to take place through the seam. It is also to be pointed out that the rubber blade 39 will yieldably press against the walls forming the mouth portion 16 of the package so that a uniform pressure will be exerted against these walls irrespective of minute irregularities which may occur in the thickness of the sheets of material.

It is also to be pointed out that in view of the fact that the rubber blade 39 will frictionally engage the walls of the mouth of the package there will not be an opportunity for the wall portions to slip with relation to each other. If the wall portions do tend to slip while the seam

is being formed the seam will pucker and a vacuum-tight seal will not be provided. The use of the rubber blade 39 will insure that the seam will be held firmly and tightly while the sealing operation is performed. The heat sealing element 41' is formed with an inclined face 42 which bears against the mouth portion 16 of the package and cooperates with the face 34 of the folding finger to exert the necessary pressure for producing a heat seal. An electrical heating element 43 is incorporated within the heat sealing member 41'.

As shown in Fig. 1, the heat sealing element is mounted on a stud 44 carried in a boss 45 of a supporting lever 46. This lever in turn is pivotally mounted within a bearing 47 upon a pin 48. The bearing 47 is carried as a part of the vacuum head 19. Suitable supporting means are provided for the free end of the lever 46 and comprises a finger 50 mounted upon a rock shaft 51. This is operated by suitable mechanism with which the present invention is not concerned.

In operation of the present invention the package 11 is placed within the mold 10 with the portion 16 extending upwardly above the top of the mold and within the pan 17. The folding fingers 22 and 23 are properly adjusted upon the pins 24 and 25 so that as the gears 26 and 27 rotate in unison the finger 23 will fold down first with the finger 22 in overlapping relation thereto. As these fingers fold downwardly to the position shown in Fig. 2 of the drawing the side walls 12 and 13 of the package will be folded toward each other at the upper end of the package and the mouth portions 16 will be closed. As the finger 22 folds over the finger 23 the mouth portion 16 will be folded down upon the face 33 of the blade portion 32 of the folding finger 23 and then at an inclination along the face 34. This mouth portion will be held down by the overlapping folding finger 22 since its metal face 38 will fold down over the material and exert pressure against the seam portion 16 to exclude granular material from the seam. At the same time the rubber blade 39 will fold down against the portion 16 of the package and will yieldably hold that portion against the face 33 of the folding finger 23. When suction action is then exerted upon the package through the pipe 20 and the ducts 21 the air will be exhausted from the package but the material therein will be entrapped. It is to be understood that the face of the rubber blade 39 may be of any desired texture. That is to say, it may be smooth, corrugated, or otherwise roughened without departing from the spirit of the invention.

After the package has been acted upon by the two folding fingers 22 and 23 to hold the mouth 16 of the package in a clamped position the heating element 41' is lowered against the outer length of the portion 16 of the package. Heat and pressure will thus be supplied in a sufficient degree to cause the "Pliofilm" forming the inner liner 15 to be heat-sealed along its abutting faces. Thus, the contents of the package will be subjected to a vacuum action, after which the mouth portion of the package will be thoroughly heat-sealed without any possibility for extraneous matter from the package to be drawn into the seal and to make an imperfect seam.

It will thus be seen that the structure here disclosed provides simple and effective means whereby a flexible container may be vacuum sealed and extraneous matter will be excluded from the

seam, thereby insuring that a tight seam and a permanent seal are readily effected.

While I have shown the preferred form of my invention as now known to me, it will be understood that various changes may be made in combination, construction, and arrangement of parts by those skilled in the art, without departing from the spirit of my invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a package sealing machine, a mold into which a flexible filled package is placed, the mouth of the package being sealed by forming a straight seam entirely across the top of the package with the inner abutting faces sealed together, a pair of folding fingers carried by the mold at opposite sides of the package, means for folding said fingers down against the side walls of the package whereby the side walls of the package will be folded together along substantially the median line of the package and whereby the side walls will be held in their folded position, and sealing means acting along said abutting seam to cause the abutting faces to cohere.

2. Same as 1, adding the following: said folding fingers operating in sequence whereby their free ends will overlap in holding the walls of the mouth of the package together.

3. In a package sealing machine, a mold into which a flexible filled package is placed, the mouth of the package being sealed by forming a straight seam entirely across the top of the package with the inner abutting faces sealed together, a pair of folding fingers carried by the mold at opposite sides of the package, means for folding said fingers down against the side walls of the

package whereby the side walls of the package will be folded together along substantially the median line of the package and whereby the side walls will be held in their folded position, sealing means acting along said abutting seam to cause the abutting faces to cohere, said folding fingers operating in sequence whereby their free ends will overlap in holding the walls of the mouth of the package together, and yieldable means on the free ends of the said fingers for exerting a yieldable pressure against the folded walls of the package.

4. Same as 3, adding the following: said yieldable means being in the form of a rubber pressure member.

5. In a package sealing machine, a mold structure within which a package may be sealed under vacuum, a pair of folding fingers mounted upon opposite sides of the mouth of the package by which the opposite side walls of the package may be folded in against each other along the median line of the package and throughout the length of the mouth of the package, rubber elements carried on the free ends of said fingers to exert a yielding force against the opposite sides of the folded mouth of the package, and sealing means acting against the folded mouth of the package when thus held to seal the same under vacuum.

6. Same as 5, adding the following: said mold being provided with a conduit to communicate with suction exerting means acting to subject the package and its contents to suction while the mouth of the package is held closed and prior to the action of the sealing means.

SAMUEL H. BERCH.