Feb. 24, 1959 L. B. ROCKLAND ET AL 2,875,070

METHOD AND APPARATUS FOR PACKAGING POWDERS AND THE LIKE

Filed Oct. 24, 1955

3 Sheets-Sheet 1

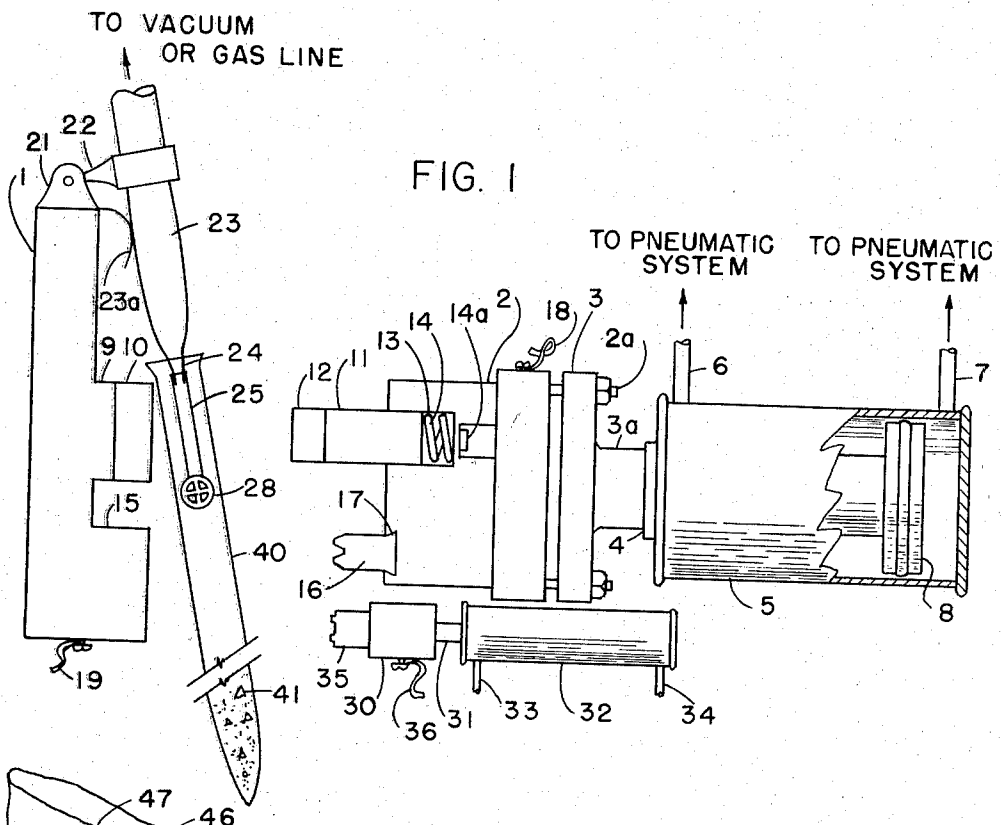



FIG. 1

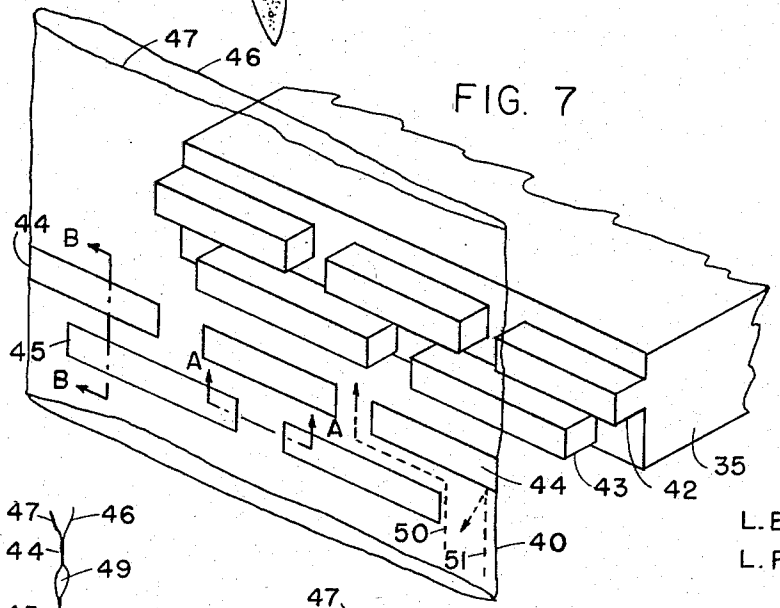


FIG. 7



FIG. 8

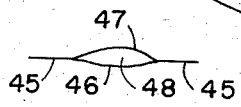


FIG. 9

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METHOD AND APPARATUS FOR PACKAGING POWDERS AND THE LIKE

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FIG. 2

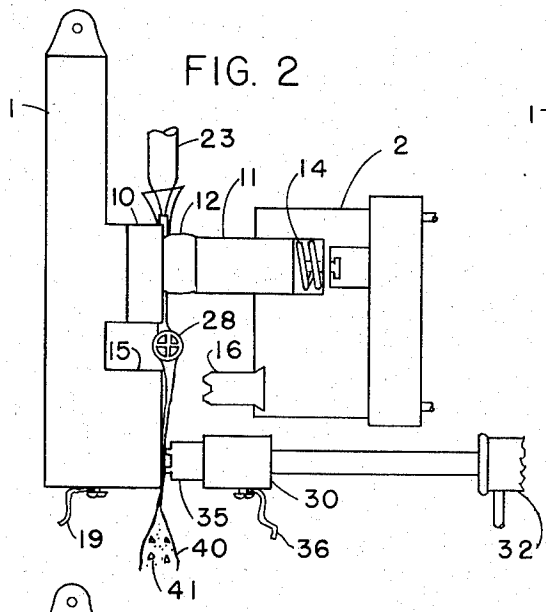



FIG. 3

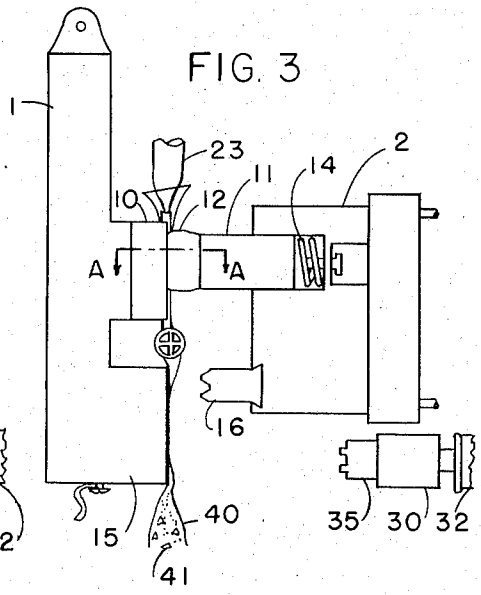



FIG. 4

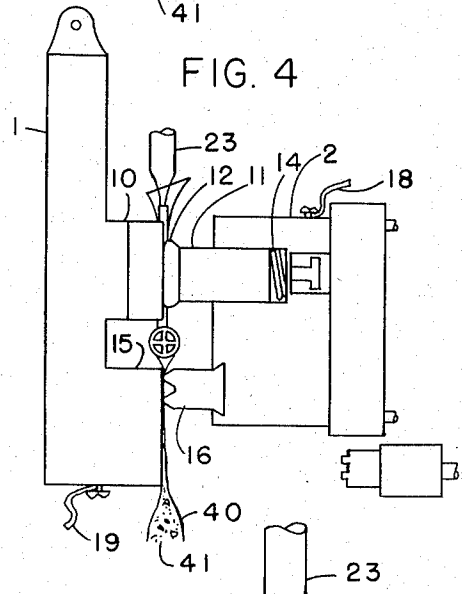



FIG. 5

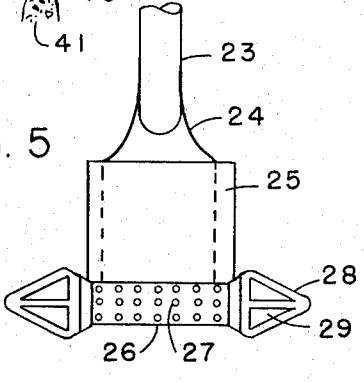
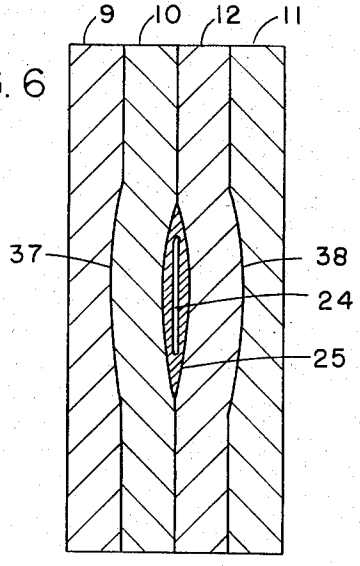



FIG. 6




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METHOD AND APPARATUS FOR PACKAGING POWDERS AND THE LIKE

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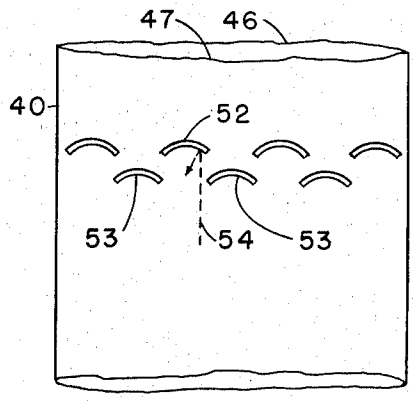



FIG. 10

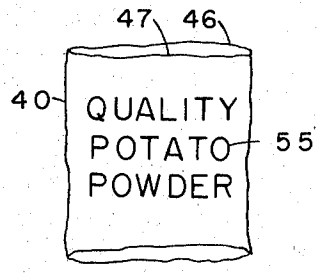



FIG. 11

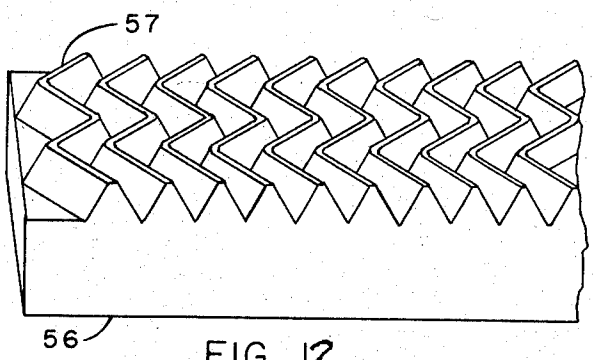



FIG. 12.

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United States Patent Office 2,875,070
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2,875,070

# METHOD AND APPARATUS FOR PACKAGING POWDERS AND THE LIKE

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Application October 24, 1955, Serial No. 542,531

10 Claims. (Cl. 99—171)

(Granted under Title 35, U. S. Code (1952), sec. 266)

A non-exclusive, irrevocable, royalty-free license in the invention herein described, throughout the world for all purposes of the United States Government, with the power to grant sublicenses for such purposes, is hereby granted to the Government of the United States of America.

This invention relates to method and apparatus for packaging materials in containers made of plastic film or other pliant sheet material and which are adapted to be sealed by application of thermal or dielectric heating. One particular object of the invention is the provision of method and apparatus by means of which containers can be evacuated, or invested with any desired fluid, prior to sealing. Another particular object of the invention is the provision of method and apparatus whereby containers holding powdery materials can be subjected to vacuum without loss of the material, without damage to the vacuum system and without interference of the powdery material with the sealing operation or the quality of the seal. Further objects and features and advantages of the invention will be apparent from the following description taken in connection with the appended drawing.

In the drawing:

Figs. 1, 2, 3, and 4 are elevations of one modification of the packaging device coming within the scope of this invention. The separate figures depict the same device in four phases of operation. Fig. 1 illustrates the device open for insertion of a container; Fig. 2 illustrates the device in the spaced-sealing phase; Fig. 3 illustrates the device in the vacuumizing phase; and Fig. 4 illustrates the device in the final sealing phase.

Fig. 5 is an enlarged side elevation of the evacuating tube.

Fig. 6 is an enlarged cross section taken on plane A—A of Fig. 3.

Fig. 7 is a three-dimensional view (on an exaggerated scale) of the spot sealing head 35 and the container after having been operated on by this head.

Figs. 8 and 9 are cross-sectional views taken on planes B—B and C—C, respectively, of Fig. 7.

Figs. 10 and 11 depict portions of containers after having been subjected to the spaced sealing operation using alternative forms of spaced seals.

Fig. 12 depicts a section of a die which may be employed to produce a herringbone-type of spaced seal.

Within recent years there has been a trend toward increased use of containers made of plastic films for packaging various products. With many types of articles such containers are quite satisfactory and often cheaper and more attractive than conventional containers of metal or paper. In some instances it is desirable to package materials under vacuum or in an atmosphere of an inert gas. Such type of packaging is desirable for example with foodstuffs which are susceptible to oxidative changes on storage. Examples of such foods are nuts, bacon, ham, and many other meat products, dehydrated fruit or vegetable juices, dehydrated potatoes, dehydrated soups, coffee, and so forth. Equipment hitherto available for such packaging purposes is complex, expensive and slow in operation. For instance, the generally used sealers are of what may be termed the cavity type. These devices include a cylinder equipped with a removable lid. The bag containing the material to be packaged is placed in the cylinder, the lid is secured, and all the air in the container is exhausted. The package is sealed while in the cylinder then the lid is opened and the sealed package removed. Such equipment has the primary disadvantage that all the air in the cylinder must be evacuated to achieve vacuum within the package. This is naturally a cumbersome technique and the packaging operation is slow because of this fact. Where the package is to be invested with an inert gas, there is considerable wastage of such gas as the entire cylinder must be filled with the gas.



In the copending patent application of L. B. Rockland and L. F. Atkinson Serial No. 542,532, filed October 24, 1955, there is described and claimed a novel packaging device which surmounts many of the disadvantages of prior art devices. One feature of the Rockland and Atkinson device is that only the air in the package itself need be exhausted to achieve sealing under vacuum. This means that the device of this application can utilize a vacuum pump of smaller size and the attainment of vacuum requires less time because there is much less volume of air to be removed. Where an inert gas or other fluid is to be introduced into the package after evacuation, only that amount of gas which is actually needed in the package is used.

The device of this invention is an improvement on that disclosed in the aforesaid application in that the present device is particularly adapted for the packaging of materials which are of a powdery nature or which contain powdery or otherwise finely-divided solid substances. The significance of this aspect of the invention is explained as follows:

In the packaging of powdery materials wherein vacuum is employed during a stage of the operations, several problems are encountered. Thus when powdery materials are subjected to vacuum, particles of the material tend to be lifted together with the previously occluded or admixed air toward the source of vacuum. The degree to which the particles are entrained in the air stream depends on many factors, particularly the size of the particles and their density. This entrainment of particles gives rise to several disadvantages in that part of the material in the container may be lost. Another point is that the particles which enter the vacuum system may damage the mechanical parts of the vacuum pump as for example causing corrosion or scoring of the pump cylinder walls, etc. A third point is that if the particles are lifted to the area of the container where the seal is eventually applied, these particles will impair the quality of the seals. Thus if the particles are sucked up and deposited on the walls of the container near the sealing area, they will become embedded in the seal, thus the seam of closure will then be porous and the package will not be gas tight. This is especially serious for example where the package is to be sealed under vacuum. In such case atmospheric pressure will force air into the package through the minute pinholes formed by the particles embedded in the seal. In many cases the particles are porous (e. g., potato granules) so that the air will be forced through these embedded particles into the package itself.

It has now been found that entrainment or sucking up of powdery materials during vacuumizing can be prevented by a simple technique. Thus in accordance with this invention the walls of the container, at a point between the device used for evacuating the air and the top level of the material in the container, are subjected to

what may be termed spot or spaced sealing. In this operation a series of spaced seals are formed across the width of the container walls, that is, the walls of the container are united in spaced areas. Preferably, several rows of spaced seals are formed, the individual seals in each row being staggered with respect to the individual seals in adjacent rows. When this sealing operation is performed the portions of the container walls in the areas between the seals become bulged or puckered to a minute extent due to the effect of the localized heating during the sealing operation. The localized heating causes the sealed areas to shrink whereby the sealed areas are pulled slightly toward one another causing an expansion and puffing of the unsealed areas of the container walls when the operation is carried out under a slight positive pressure within the container. The net result of this, regardless of any theoretical considerations, is that the spaced sealing operations causes the formation of what may be termed a maze or labyrinth of minute tubules between the spaced seals. When vacuum is applied to the container holding a quantity of powdery material, some of the particles will tend to rise with the air. These particles will however be trapped in the tortuous passages between the spaced seals and will thus effectively be removed from the field of action. As a net result, there is no loss of particles, particles are not sucked into the vacuum system and there is no interference with the final sealing of the container. As disclosed hereinafter the spaced seals, or areas of union between the side walls, may take various forms or shapes but to provide in every case a series of what may be termed tortuous or indirect passages between the sealed areas. The puckering effect referred to above has an additional advantage in that this puffing out of the side walls of the container in the areas where the walls are not sealed together causes the establishment of minute tubules which do not tend to flatten out when vacuum is applied to the container. The result is that when vacuum is applied these tubules remain open so that the air in the container can readily pass through them toward the vacuum source.

The packaging apparatus and the principles of its operation are explained as follows:

Fig. 1 illustrates the sealing device in its open position for reception of a bag to be sealed. The device includes fixed jaw **1** and movable jaw **2**. Jaw **2** is adjustably attached by screws **2***a* to platen **3** which in turn is attached to shaft **3***a*. This shaft extends through packing gland **4** in cylinder **5** there being a piston **8** attached to shaft **3***a* within cylinder **5**. At the opposite ends of cylinder **5** are provided pipes **6** and **7**, these being connected to a conventional pneumatic pumping system (not illustrated). It is evident that by forcing the air into pipe **6** and withdrawing the air through pipe **7**, jaw **2** can be moved away from jaw **1**. By reversing the flow of air, jaw **2** can be moved toward jaw **1**. Jaws **1** and **2** are preferably made of aluminum, brass or other electrically-conductive metal in the modification in which the bags are electrically sealed, that is, by applying a high frequency current across the bag at the point of sealing. If sealing is to be carried out by thermal means, that is, by application of a heated blade to the bag, then the jaws may be constructed of strong, heat-insulating material. Where the jaws are made of metal, their inner faces may be covered with an electrically-insulating material to prevent accidental shock to the operator.

The means for pinching shut the open end of a bag to prevent loss of vacuum or positive pressure in the bag during such operations as spaced sealing, permanent sealing, etc. includes boss **9** mounted on jaw **1**, this boss being covered with pad **10** made of rubber or other flexible material. Cooperating with these members and located on jaw **2** is arm **11** covered with rubber pad **12**. Arm **11** is slidably received in horizontal slot **13** so that the arm can move toward or away from jaw **1** in a horizontal plane. A series of springs **14** adapted to exert an outward bias (toward jaw **1**) against arm **11** is provided within slot **13**. Arm **11** is equipped with bolts **14***a* which act as limit of motion devices to prevent springs **14** from ejecting arm **11** out of slot **13**.

The means for final sealing of the bag includes anvil **15** protruding from the inner face of jaw **1**. This anvil is metallic for use with an electrical sealing system or is made of silicon rubber, for example, for use with thermal sealing, that is application of a heated blade. Cooperating with anvil **15** is metallic sealing blade **16** carried by jaw **2**. The sealing blade illustrated has a double bag-contacting head and will establish a double seam of sealing across the mouth of the bag. Blades for forming a single seam or more than two seams may be used as desired. Sealing blade **16** may be exchanged for another of different shape by sliding it out of keyway **17**.

A suitable generator of high-frequency electromagnetic waves (not illustrated) is connected via wires **18** and **19** to jaws **2** and **1**, respectively. When the generator is actuated, the current will flow through the bag to be sealed at the area of contact between anvil **15** and blade **16** causing the sides of the bag to be fused together.

The mechanism for establishing the spaced seals across the mouth of the bag includes a secondary movable jaw **30** mounted on shaft **31**. This shaft protrudes into cylinder **32** which is provided with a piston (as in the case of cylinder **5**). By controlling the flow of air or hydraulic fluid through pipes **33** and **34**, jaw **30** can be moved toward or away from jaw **1**. On jaw **30** is mounted a sealing blade **35**, the inner surface of which is provided with a series of protuberant elements, as depicted in Fig. 7, for forming a series of spaced seals across the walls of the bag.

One lead of a conventional high-frequency generator (not illustrated) is connected to common terminal **19** on jaw **1**; the other lead is connected through a switch to terminal **36**. The generator supplies the current for forming the spaced seals when blade **35** is pressed against anvil **15**. If the spaced seals are to be formed by applying a heated blade to the bag, then blade **35** may be provided with conventional device for heating it by a resistance coil or the like.

The means for withdrawing air from the bag or introducing a desired fluid therein is described as follows:

Upon jaw **1** is bracket **21** on which is pivoted arm **22** which bears tube **23**. Spring **23***a* biases tube **23** away from jaw **1** when the jaws are open. Tube **23** is connected at its upper end through suitable valve arrangement to a source of vacuum and a source of inert gas or other fluid desired for introduction into the bag.

The lower portion of tube **23** is flattened as at **24**. About the flattened portion is provided a rubber, wing-like member **25**, see Figs. 5 and 6.

Referring now to Fig. 5, it is seen that tube **23** connects with barrel **26** provided with perforations **27**. The ends of barrel **26** are provided with cages **28**, the diameter of these being somewhat larger than the diameter of barrel **26**. Air or other fluid can pass freely through perforations **27** into tube **23** or through apertures **29** into the open ends of barrel **26** and thence into tube **23**.

The operation of the packaging device is described as follows:

Jaws **1**, **2**, and **30** are open as shown in Fig. 1 and tube **23** is pivoted away from jaw **1** also as shown in this figure. A bag **40** of polyvinylidene film or the like into which powdery material has been deposited is inserted between the jaws so as to envelope the lower portion of tube **23**.

A. *Formation of the spaced seals* (*Fig. 2*).—The pneumatic system connected to pipes **6** and **7** is actuated to move jaw **2** to the left to the position shown in Fig. 2. At this stage, the power exerted by the pneumatic system is so balanced against the expansive bias of springs

14 that pads 10 and 12 are in tight engagement whereas anvil 15 and sealing blade 16 are a small distance apart. The engagement of pads 10 and 12 causes a closing of the mouth of bag 40 so that the bag can then be filled with a gas or evacuated.

The pneumatic system connected to pipes 33 and 34 is then actuated to move jaw 30 and spaced sealing blade 35 to the left to the position shown in Fig. 2 wherein blade 35 is pressing bag 40 against anvil 15. Air or other inert gas is then introduced into the bag 40 through pipe 23 to maintain a slight positive pressure therein. By maintaining a positive pressure within the bag during the spaced sealing operation, the formation of tubules between the seals is assured. The source of high frequency current is then connected to terminals 19 and 36. As a result, the walls of bag 40 are provided with a series of spaced seals 44, 45 and tubules 48, 49 as depicted in Figs. 7 to 9 and as further explained below. As soon as the spaced seals are formed, jaw 30 is retracted to the position shown in Fig. 3.

B. *Evacuation of the container* (*Fig. 3*).—Jaw 2 is maintained in the position previously described wherein pads 10 and 12 are in engagement and thus close the mouth of bag 40.

Tube 23 is then connected to a source of vacuum. As the air is sucked out of bag 40, the walls of the bag collapse. However, barrel 26 and cages 28 prevent the collapsing walls of the bag from plugging up the passageway to tube 23. In particular, the walls of the bag are drawn tightly to perforations 27. As a result the bag is so firmly held that its walls cannot be sucked into apertures 29 with the result that these apertures remain open and air can pass through them into barrel 26 and into tube 23.

Particles of material 41 which may be entrained in the air stream are deflected by the spaced seals formed in the first operation (Fig. 2) and thus do not interfere with the vacuumizing step.

Referring to Fig. 6 it can be seen that during the evacuation and sealing phases, no air can get into or out of the bag 40 except, of course, through tube 23. Thus the bag is squeezed shut between pads 10 and 12. During these phases the pressure forcing jaws 1 and 2 together also causes pads 10 and 12 to deform about wing-like member 25 so that no air can leak in about the flattened portion 24 of tube 23 or about the sides of the wing 25. The boss 9 and arm 11 are recessed slightly as at 37 and 38 to permit deformation of pads 10 and 12 to conform to the shape of wing member 25.

It is obvious that members 9, 10, 11, 12, 15, 16, and 35 should have a length (the dimension running at right angles to the paper on which Figs. 1 to 4 are drawn) greater than the width of bag 40. On the other hand wing 25 should be of less width than the bag so that the bag can easily be placed about the wing when the packaging operation is initiated.

C. *Sealing operation* (*Fig. 4*).—After bag 40 has been exhausted, the pneumatic system connected with tube 7 is activated to increase the pressure acting on the right side of piston 8 whereby to overbalance the expansive force of springs 14. As a result anvil 15 and sealing blade 16 bear against the walls of bag 40 extending between them, as shown in Fig. 4. At this time the source of electrical energy connected to terminals 18 and 19 is turned on and as a result of the heating effect taking place at the point of contact the bag is sealed along seams corresponding with the length of blade 16.

After the sealing has been completed, the pneumatic system of cylinder 5 is activated to move piston 8 to the right whereby the sealed bag is released and drops out from between jaws 1 and 2. The device is then ready for sealing of the next package.

The feature of the invention as concerns the use of spaced sealing to deflect particles of material is further explained as follows:

As explained above and as depicted in Fig. 2, bag 40 is subjected to spaced sealing prior to evacuation. This is done by forcing sealing blade 35 against anvil 15 and actuating the high frequency energy source connected across terminals 19 and 36 while the bag is under a slight positive pressure of gas in the bag. The positive pressure insures proper tubulation of the area around the spaced seals.

Referring now to Fig. 7, it can be seen that the inner face of sealing blade 35 is provided with an upper row of protuberant elements 42 and a lower row of protuberant elements 43, the individual elements in one row being staggered with respect to those in the other row. The edges of the elements are rounded to prevent cutting the container walls. (For the sake of simplifying the illustration, only five elements are depicted.) When the bag 40, under slight gas pressure, is compressed between anvil 15 and elements 42 and 43 and the high-frequency electrical source is connected across the anvil and the elements, there is formed the spaced seals indicated as 44 (formed by elements 42) and 45 (formed by elements 43). Within the areas of these seals, the walls 46 and 47 of bag 35 are fused together. The localized heating which takes place during the sealing operation causes a shrinkage in the sealed areas whereby the walls 46 and 47 are forced apart and expanded slightly in the non-sealed areas between the seals. As a result there is formed a series of minute tubular passageways 48 between adjacent seals in the same row and similar passageways 49 between seals in adjacent rows (see Figs. 8 and 9). When the bag 40 is evacuated, air can pass through these tubules along paths indicated for example by dotted line 50. The entrained particles will be deflected by striking the various portions of the sealed areas as shown by dotted lines 51. It is obvious that the number and size of the spaced seals provided will depend on the flotation (entrainment) characteristics of the material being packaged. It is evident for example that with a material which tends to be floated only to a minor degree, only a few spaced seals will be necessary. Where however the material is very fine or otherwise has a high tendency to be entrained in the air stream the number of rows of spaced seals may be increased to provide a more tortuous path between the upper and lower portions of bag 40 whereby a more efficient deflection of the particles will be accomplished.

It is also to be noted that the spaced seals need not necessarily be of the shape depicted in Fig. 7. Thus the seals may be of triangular, cubic, or curved pattern, the latter being depicted in Fig. 10. In this case the particles striking the lower edges of upper seals 52 will tend to bounce downward into the gap between the lower seals 53 as illustrated by dotted line 54.

It is evident that the spaced seals formed on the container become a permanent part of the container since the container is eventually sealed at a point above the spaced seals. Consequently the operation of spaced sealing may be utilized for equipping the package with any indicia. To this end the protuberant elements 42, 43 on sealing blade 35 may be shaped in the form of letters thus to form sealed areas which spell out a desired message as for example the manufacturer's name, etc. Fig. 11 illustrates such a type of operation wherein the letters 55 constitute the spaced seals.

If the package is to be invested with a fluid prior to sealing, the following technique is applied. Bag 40 is exhausted as previously described then tube 23 is connected with a source of fluid, for example dry air, nitrogen, etc., to introduce this material into the bag while the device is kept in the position of Fig. 3. Jaw 2 is then moved further to the left to cause engagement of the sealing anvil and blade (15 and 16) as shown in Fig. 4 and the sealing is effectuated as before.

Introduction of an inert gas, such as nitrogen, into the container after evacuation and prior to sealing is often desirable with divers food products to protect them from

oxidation, etc. during storage. Also by introducing a gas of this type the particles **41** will be loose within the package after sealing. If the package is sealed under vacuum the walls of bag **40** will remain tightly collapsed about the particles **41** so that the package will be a rigid unit and particles **41** will be held tightly together by the pressure of the atmosphere acting on the external walls of the bag. Thus there is a matter of appearance to be considered here as to whether the final package is desired to be limp and contain loose articles (sealed in gaseous atmosphere) or whether the final package is desired as a rigid unit with coherent particles within it (sealed under vacuum).

The invention may be utilized for the packaging of any type of material, particularly materials such as food products which are best preserved under vacuum or in an atmosphere of an inert gas. The invention is especially adapted for the packaging of food materials which are in subdivided form as for example in the form of powders, granules, beads, small crystals, liquids, or other particles which exhibit a tendency to be entrained in the leaving air when a package thereof is subjected to vacuum. Examples of such products are dried potato granules; spray-dried products of divers types such as spray-dried coffee, tea, tomato juice, orange juice, grapefruit juice, meat juice, soups, etc.; cereal products such as flour, starch, etc.; and other dehydrated fruit, vegetable, meat, cereal, or carbohydrate products which are in the form of fine particles or which contain fine particles in admixture with coarser particles. In regard to the last item, the invention is of advantage in packaging such products for example as candies or dried fruit which contain a surface coating of powdered starch, powdered sugar or mixtures thereof. In such case the powdery coating will not interfere with the packaging operation.

Instead of an inert gas or together with the inert gas, other fluids can be introduced into the package prior to sealing. Thus in packaging food products, after the container is exhausted a stream of nitrogen, dry air or the like may be used as a carrier to introduce divers vapors into the package. In this manner one may introduce vapors of such agents as: antioxidants, for example butylated hydroxyanisole, Nordihydroguaiaretic acid, propyl gallate, and so forth; enzyme-inactivating agents as sulphur dioxide; flavoring agents as volatile fruit essences, essential oils, hickory wood smoke, acetic acid, and so forth; fungicides as propylene oxide; etc. In the case of packaging hardware or other metallic objects, vapors of corrosion-preventing agents may be inserted in the package in the same fashion. Further extensions of these principles will be obvious from the foregoing.

In the preferred modification of this invention, high-frequency electrical energy is used for sealing the plastic film package. It is obvious that other sealing techniques can be used compatible with the type of film from which the container is made. For example, sealing head **16** may be provided with internal coils heated by passage of an electrical current whereby head **16** becomes hot and the sealing is effectuated simply by applying thermal heating during the phase when blade **16** and anvil **15** are in engagement. The same type of modification can be applied to spaced-sealing head **35**.

For rapid sealing of packages on the device of this invention it is preferred that there be provided rapid-acting mechanisms for actuating the movement of jaws **2** and **30**, connection of tube **23** to the vacuum source, connection of tube **23** to the fluid source for adding fluid to the package, activating the high frequency electrical supply for spaced-sealing and final sealing, etc. To this end there may be provided a series of push-button switches which operate through relays to activate the various valves and switches to accomplish the proper series of activities. Devices of this type are purchasable on the open market and need not be described further herein.

To prevent adhesion of the plastic film to anvil **15** and sealing blades **16** and **35** it is usually desirable that these members be covered with a thin film of polyfluoroethylene or other heat-resistant non-adhesive, synthetic resin.

We claim:

1. In the process of packaging divided material in a sacciform container having an open upper end and a closed lower end, wherein a quantity of the divided material is deposited in the lower end of the container and wherein the container is evacuated prior to closure, the improvement which comprises uniting the side walls of the container at spaced areas across the width of the container at a position above the level of material in the container whereby to form a series of small indirect passageways between the areas, and thereafter evacuating the container from a point above said position.

2. A process of packaging a divided material in a bag-like container which comprises depositing a quantity of the material in the container, uniting the side walls of the container above the deposit of material at spaced areas across the width of the container, the areas of union being arranged in such a pattern as to provide a series of small indirect passageways therebetween, evacuating the container from a point above said spaced, united areas and thereafter sealing the container.

3. The process of claim 2 wherein the container is made of thermoplastic sheet material and wherein the side walls of the container are united by compressing the side walls at spaced areas and applying high-frequency electrical energy at these areas.

4. A process of packaging a divided material in a bag-like container which comprises depositing a quantity of material in the container, forming a particle deflector in the container intermediate the top of the container and the level of the material therein by uniting the side walls of the container at spaced intervals across the width of the container, evacuating the container from a point above area of union, and thereafter sealing the container.

5. A process of packaging a divided material in a bag-like container which comprises depositing a quantity of the material in the container, forming a particle deflector in the container intermediate the top of the container and the level of material therein by uniting the side walls of the container at spaced areas across the width of the container, the areas of union being in a pattern such that the areas of non-union therebetween define a labyrinthine passageway connecting the section of the container holding the material and the upper end of the container, evacuating the container from a point above the areas of union, and thereafter sealing the container.

6. A process of packaging a divided material in a bag-like container made of thermoplastic, pliant sheet material which comprises depositing a quantity of material in the container, forming a particle trap within the container intermediate the top of the container and the level of material therein by compressing the side walls of the container at spaced areas across the width of the container and applying high-frequency electrical energy at these areas whereby the side walls of the container are united at spaced areas across the width of the container, the areas of union being in a pattern such that areas of non-union therebetween define a labyrinthine passageway connecting the section of the container holding the material and the upper end of the container, the side walls of the container between areas of union being puckered outwardly as a result of the uniting procedure to define minute tubules between the areas of union, evacuating the container from a point above the areas of union, and thereafter sealing the container.

7. The process of claim 6 wherein the spaced areas of union extend in at least two parallel rows across the width of the container and wherein the individual areas

in one row are staggered with respect to the individual areas in the adjacent row.

8. The process of claim 7 wherein the spaced areas are each in the form of a letter, the areas in the aggregate defining embossed indicia.

9. A food package comprising a container made of thermoplastic, pliant sheet material, a quantity of divided food material in the base of the container, a particle trap within the container intermediate the top of the container and the level of food material therein, said trap being formed by union of the side walls of the container at spaced areas across the width of the container, the areas of union being in such a pattern as to provide a series of small indirect openings therebetween thus to define in the aggregate a labyrinthine passageway connecting the section of the container holding the food material and the upper end of the container.

10. A process of packaging material in a sacciform container of thermoplastic, pliant sheet material having



an open upper end and a closed lower end which comprises depositing a quantity of material in the lower portion of the container, compressing together the side walls of the container at spaced areas across the width of the container at a position above the level of material in the container while applying heat at said spaced areas to cause the side walls of the container to be united together at said spaced areas, the areas of non-union therebetween providing a series of passageways interconnecting the section of the container holding the material and the upper end of the container, evacuating the container from a point above the areas of spaced union, and sealing the container.

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