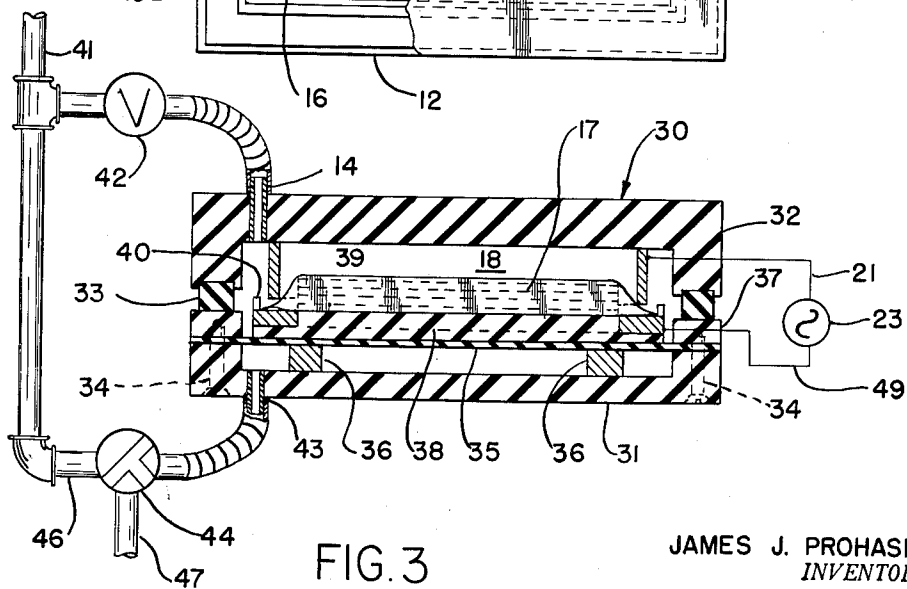
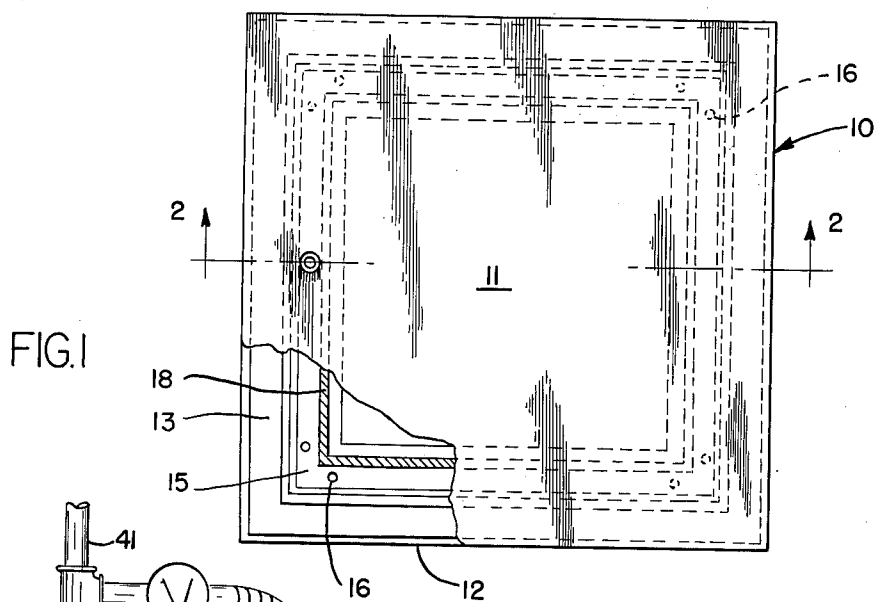
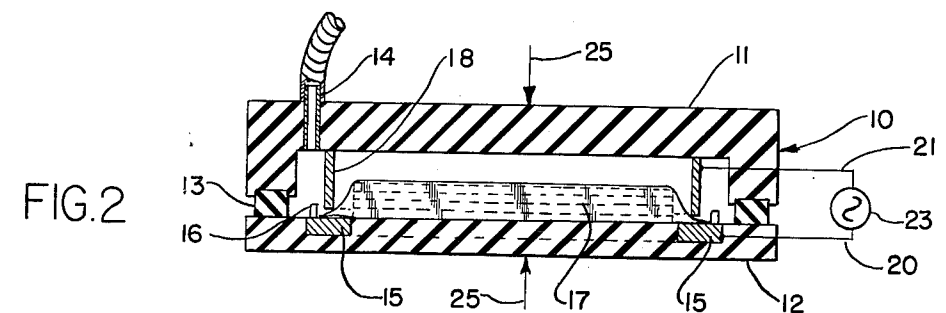


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J. J. PROHASKA
PACKAGING APPARATUS
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PACKAGING APPARATUS

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The present invention relates to a method and apparatus for producing sealed packages having specified fluid conditions therein.

The device I have devised is one in which the container to be sealed is placed in a chamber in which the fluid conditions may be controlled. After these conditions are brought to the desideratum, sealing irons are brought into contact with the portions of the package to be sealed, pressure applied and the sealing accomplished. In the preferred embodiment of the invention, the sealing irons are electrodes connected to a high frequency electronic generator and the heat generated by reason of the dielectric loss in the material of the container and the applied high frequency energy. However, it will be apparent that other forms of heating devices could be substituted for those in the disclosed embodiments.

A particular feature of the invention is the structure by which the sealing irons are brought into contact with the sides of the package after the chamber has been closed and the atmosphere therein controlled, without requiring any moving parts passing through the walls of the chamber with their attendant difficulties, such as seals, etc.

While the structures hereinafter described were devised for the purpose of vacuum packaging food products, it is readily apparent that the invention has applications considerably broader than this field. For example, it could be used not only in vacuum packaging, but in packaging under pressure. It could also be used in the packaging of substances in atmospheres of special gases, or it even is applicable to the packaging of products in which liquids are inserted into the container.

One of the principal advantages of this invention is its simplicity. It has no moving parts, in the normal sense, and thus there is little to create maintenance problems.

Another further advantage of the invention is that it is eminently suited for automatic machine operations. All the movements can be obtained by simple mechanical operations, and the device can readily be tied in to conventional conveyor structures for transporting the containers of substances to be sealed into packages.

Additional objects and advantages will become apparent from the following description taken in conjunction with the drawings, in which:

Fig. 1 is a plan view of an embodiment of the invention;

Fig. 2 is a section taken at line 2—2 of Fig. 1; and

Fig. 3 is an elevational section of a second embodiment of the invention.

Referring first to Fig. 1, the illustrated device includes a hollow body, generally 10, having a separate top 11 and bottom 12, with a resilient gasket 13 therebetween. Top 11 has a fluid connection 14 through which the atmosphere within the central portion of body 10 may be controlled.

Preferably the top 11 and base 12 are rigid non-conductors. A pressure sealing head in the form of stain-

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less steel electrode 15 of rectangular configuration is inset within base 12. About the base are a plurality of non-conductive aligning pins 16, used to position a package 17 in a fixed alignment within the central opening of body 10.

In the illustrated embodiment, the invention is used for sealing the overlapping edges of a rectangular package, which package is formed of two sheets of a plastic film such as polyvinylidene chloride, a substance which may be purchased under the trademark, "Saran." The properties of such material are eminently suited for the packaging of food and for being sealed by dielectric heating.

An upper pressure sealing head in the form of an electrode 18 is a rectangular stainless steel strap shaped to over-lie the overlapping edges of package 17. The electrode 18 is attached to the top 11. A high frequency generator 23 is connected to the two electrodes 15 and 18 by wires 20 and 21 respectively and operated in a manner well known in the art.

The operation of the embodiment of Figure 1 is extremely simple. The filled package 17, having at least a portion of its edges unsealed, is placed in the interior of the body 10 by separating the top and bottom of the body to permit access thereto. Subsequently the body is closed and a vacuum is applied to the interior of the body through connection 14. It is important to note that at the time the vacuum is applied the top electrode 18 is spaced well above the upper surface of the edges of the package 17, thus assuring that there is a free fluid communication between the interior of the package 17 and the interior of the body 10 for the drawing of a vacuum in the interior of the package.

After the desired vacuum has been obtained, pressure is applied to the top and bottom 11 and 12 respectively of the body 10, as indicated by arrows 25. The pressure compresses the resilient gasket 13 and permits the upper electrode 18 and the lower electrode 12 to come together to press the edges of the packages therebetween. While this pressure is maintained about the outer edges of the package, the edges are heated dielectrically from high frequency generator 23 to soften the film and cause the two sheets of film to form a seal about said package edges. The pressure and vacuum may subsequently be released to permit the body to be opened and the sealed package to be removed therefrom.

In Figure 3, the body generally 30 is made up of a pair of cup-shaped members 31 and 32, and a gasket 33, positioned between the edges thereof. The structure of the top member 32, and the parts associated therewith, corresponds to the structure of the top member 11 of the embodiment illustrated in Figures 1 and 2 and corresponding numbers have been applied to the corresponding parts attached to the top member 32.

Bottom member 31 has a rubber diaphragm 35 therein, which diaphragm is spaced from the bottom of the interior opening of cup-shaped member 31 by lugs 36. Diaphragm 35 is held in place by a hollow square insulating block 37 secured to base 31 by screws 34.

Resting upon the diaphragm 35 is an insulator block 38 within which an electrode 39 is inset. A plurality of aligning pins 40 are used in the same manner and for the same purpose as were the pins 16 described in connection with the embodiment of Figures 1 and 2.

Vacuum connection 14 on the top member 32 is connected to a vacuum line 41 through a control valve 42. A fluid connection 43 in base member 31 communicates with the space below diaphragm 35 and also with a three-way valve 44. Three-way valve 44 has a connection 46 to vacuum line 41 and a connection 47 which is open to the atmosphere, thus permitting the space below

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diaphragm 35 to be placed in communication with either vacuum line 41 or the atmosphere.

The embodiment illustrated in Figure 3 is operated in much the same manner as that described in connection with the embodiment of Figures 1 and 2. The unsealed package 17 is placed within the internal cavity of the body, the body closed, and vacuum applied to the inner cavity of the body. The vacuum is applied to both sides of diaphragm 35 in order to hold the electrodes 18 and 39 spaced apart until the desired vacuum has been drawn on the interior of package 17. Valve 44 is then operated to bring the space below diaphragm 35 into communication with the atmosphere, the effect of which is to apply a pressure to the bottom of the diaphragm, raising the diaphragm and block 38 to press the edges of the package between the two electrodes 39 and 18. The edges are sealed by dielectric heating from generator 23 connected to electrodes 18 and 39 by wires 21 and 49 respectively.

It is believed apparent that the sealing apparatus could be employed without the electronic generator 23 when sealing packages wherein the packaging material had pressure sensitive coating, as for example as disclosed in U. S. Patent No. 2,329,055. In such a case the elements 18 and 15 are employed to apply the pressure necessary to cause the adherence of the wrapping material.

The foregoing description of specific embodiments is for the purpose of complying with 35 U. S. C. 112 and should not be construed as imposing unnecessary limitations upon the appended claims.

I claim:

1. A sealing device for preparing packages of a given size and shape having special fluid conditions therein, said device including a hollow case having a separable top and bottom, gasket means between said top and bottom, a first electrode means mounted on said bottom, said electrode means being at least the size and shape of one face of said package, aligning means to position said package on said electrode means, a second electrode means mounted on said top in a position to be over said first electrode means when said case is closed, means including a resilient member to hold the two electrode means spaced from each other after the case has been closed, external electrical connections for each of said electrode means, said case having a fluid line connection communicating with the interior of said case to apply said conditions to said package after it is inserted into the case, and means operable from outside the case to move said resilient member to bring said two electrode means into contact with either side of said package after the insertion thereof into the case and the case closed.

2. A sealing device for preparing packages having special fluid conditions therein, said device including a hollow case having a top and a bottom, a resilient gasket between said top and bottom spacing the two apart to form a closed chamber, said gasket being normally compressible a predetermined distance, a pair of electrode means within said case, external electrical connections for each of said electrode means, a fluid line connection communicating with the interior of said case, said electrode means being mounted from the top and bottom respectively in such positions that the two electrode means are spaced from each other with the package therebetween when the case is closed with the spacing between the electrode means being less than the distance which the gasket may be compressed whereby pressure applied to the top and bottom of the case will compress said gasket and bring said electrode means into contact with either side of said package.

3. A sealing device for preparing packages having special fluid conditions therein, said device including a hollow case having top and bottom members, sealing means between said members, a diaphragm dividing a portion of the space within said case into a closed compartment, a

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first electrode supported on said diaphragm, a second electrode mounted from the case in a position corresponding to and spaced from the position of the first electrode when the case is closed whereby the portions of the package to be sealed will fit therebetween, external electrical connections for each of said electrodes, and two fluid connections in said case, each connection being in communication with the space at an opposite side respectively of said diaphragm whereby the fluid conditions under which the package is sealed may be controlled and the diaphragm and first electrode may be moved by fluid pressure to press the portion of the package to be sealed between the two electrodes.

4. A sealing device for preparing packages having special fluid conditions therein, said device including a hollow case formed of a pair of cup-shaped members and a gasket between the edges of said members, one of said members forming the base and having a diaphragm spaced from the bottom thereof, means to hold the diaphragm in place and to form a seal between the edges of the diaphragm and the inside of said base member, supporting means for said packages mounted on said diaphragm, said supporting means having aligning members thereon to position said package in said case, said supporting means including an electrode aligned under the portion of the package to be sealed, a second electrode mounted on the other of said members and projecting downwardly along the line of the portion of the package to be sealed, external electrical connections for each of said electrodes, and two fluid connections in said case, each connection being in communication with the space at an opposite side respectively of said diaphragm whereby the fluid conditions under which the package is sealed may be controlled and the diaphragm and first electrode may be moved by fluid pressure to press the portion of the package to be sealed between the two electrodes.

5. A device for sealing product of a given size into packages having special fluid conditions in said package and with the edges of the packaging material extending outwardly from said product, said device including a hollow case, said case being adapted to be opened to permit the unsealed package to be inserted into the case and to be removed from the inside of said case, a pair of normally spaced electrode means within said case, one of said electrode means having a wall portion defining a space larger than said size whereby said unsealed package may be received within said space with said edges overlapping said portion, the other of said electrode means being aligned with said portion and normally spaced therefrom whereby said edges may be loosely received therebetween, said case having a fluid line connection communicating with the interior of said case to apply said conditions to said package after it is inserted into the case, and means operable from outside the case to bring said electrode means into contact with either side of said package after insertion thereof into the case and the applying of the special fluid conditions thereto.

6. A device for sealing product of a given size into packages wherein the edges of the packaging material extend outwardly from said product and which packages have special fluid conditions therein, said device including a hollow case having a separable top and bottom, gasket means between said top and bottom, a first electrode means mounted on said bottom, a second electrode means mounted on said top in a position to be aligned with and spaced from said first electrode means when said case is closed, one of said electrode means having a wall portion defining a space larger than said size whereby packages of product may be received within said space with said edges overlapping said portion, said case having a fluid line connection communicating with the interior of said case to apply said conditions to said package after it is inserted into the case and the case closed, and means operable from outside the case to move the electrode

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means together to contact either side of said edges after the insertion thereof into the case and the case closed.

7. A device for sealing product into packages having special fluid conditions therein, said device including a hollow case having separable top and bottom members, a first electrode means mounted on said bottom member, a second electrode means mounted on said top member in a position to be aligned with and spaced from said first electrode means when said case is closed, deformable means associated with one of said members and adapted to normally position the electrode means mounted on said one member a spaced distance from the other electrode means, pressure means for applying pressure to said deformable member to deform said member to move the electrode means mounted on said one member toward said other electrode means to close the two electrode means over the edges of the package to be sealed, at least a portion of said pressure means being outside said case whereby said pressure may be applied after the case is closed, and external electrical connections for said electrode means, said case having a fluid line connection communicating with the interior of said case to apply said conditions to said package after the case is closed and before the passage is sealed.

8. A sealing device for preparing packages having special fluid conditions therein, said device including a hollow case having a top and bottom, a resilient gasket between said top and bottom spacing the two apart to form a closed chamber, said gasket being normally compressible a predetermined distance, a pair of pressure sealing means within said case, a fluid line connection communicating with the interior of said case, said pressure sealing means being mounted from the top and bottom of said case respectively in such positions that the two pressure sealing means are spaced apart from each other with the package therebetween when the case is closed with the spacing between the pressure sealing means being less than the distance which the gasket may be compressed whereby pressure applied to the top and bottom of the case will compress said gasket and bring said pressure sealing means into contact with either side of said package.

9. A sealing device for preparing packages having special fluid conditions therein, said device including a hollow case having top and bottom members movable between a position at which said members form a closed case and a position at which said members are separated to permit the insertion and removal of packages, means between said members to form a fluid tight seal between the top and bottom members when the case is closed, a diaphragm dividing a portion of the space within said case into a closed compartment, a first pressure sealing head supported on said diaphragm and a second pressure sealing head mounted from the case in a position corresponding to and spaced from the position of the first pressure sealing means when the case is closed whereby the portions of the package to be sealed will fit therebetween, and two fluid connections in said case, each connection being in communication with the space at an

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opposite side respectively of said diaphragm whereby the fluid conditions under which the package is sealed may be controlled and the diaphragm and first pressure sealing means may be moved by fluid pressure to press the portion of the package to be sealed between the two pressure sealing means.

10. A sealing device for preparing packages having special fluid conditions therein, said device including a hollow case formed of a pair of cup-shaped members and a gasket between the edges of said members, one of said members forming a base and having a diaphragm spaced from the bottom thereof, means to hold the diaphragm in place and to form a seal between the edges of the diaphragm and the inside of said base member, supporting means for said packages mounted on said diaphragm, said supporting means having aligning members thereon to position said package in said case, said supporting means including a pressure sealing head aligned under the portion of the package to be sealed, a second pressure sealing head mounted on the other of said members and projecting downwardly along the line of the portion of the package to be sealed, and two fluid connections in said case, each connection being in communication with the space at an opposite side respectively of said diaphragm whereby the fluid conditions under which the package is held may be controlled and the diaphragm and first pressure sealing head may be moved by fluid pressure to press the portion of the package to be sealed between the two pressure sealing heads.

11. A device for sealing product into packages having special fluid conditions therein, said device including a hollow fluid tight case having separable top and bottom members, a first sealing means mounted on said bottom member, a second sealing means mounted on said top member in a position to be aligned with and spaced from said first sealing means when said case is closed, deformable means associated with one of said members and adapted to normally position the sealing means mounted on said one member a spaced distance from the other sealing means, and pressure means for applying pressure to said deformable member to deform said member to move the sealing means mounted on said one member toward said other sealing means to close the two sealing means over the edges of the package to be sealed, at least a portion of said pressure means being outside said case whereby said pressure may be applied after the case is closed, said case having a fluid line connection communicating with the interior of said case to apply said conditions to said package after the case is closed and before the package is sealed.

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