

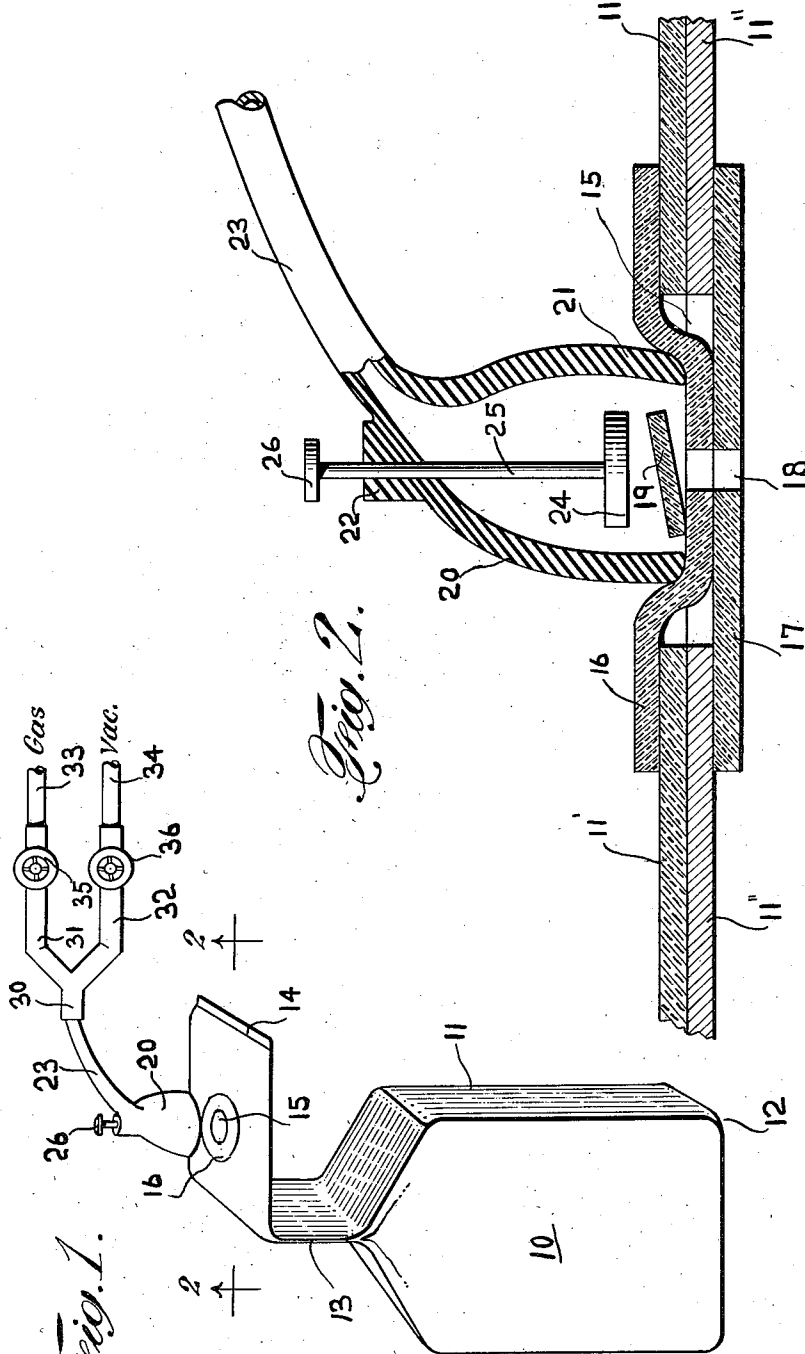
Nov. 27, 1951

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2,576,322

BAG WITH VACUUM SEALED VALVE CLOSURE

Filed July 5, 1947



INVENTOR

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UNITED STATES PATENT OFFICE

2,576,322

BAG WITH VACUUM SEALED VALVE
CLOSURE

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Application July 5, 1947, Serial No. 759,066

2 Claims. (Cl. 229—62.5)

1

This invention relates to improvements in vacuum packaging and, more particularly to a flexible container and a method and apparatus for imposing and maintaining a vacuum thereon.

In the packaging of natural products such as nuts, flour, grains, and grain products generally, there is a distinct problem in keeping the products free from insect infestation, such as infestation by weevils. Also, in the shipment and storage of garments made from wool and animal fibres, the prevention of damage by moths is of paramount importance.

It has been found that if weevils, moths and their eggs and larvae are subjected to and maintained under a vacuum for a certain period, the insects and their larvae become dormant and are killed.

The present day equipment required for moth-proofing or treatment of natural products to inhibit or remove weevil infestation, is costly and space consuming and the moth-proofing and weevil-proofing processes are time and labor consuming. Furthermore, such methods are available only in large cities and industrial centers.

The problems of weevil infestation and like vermin infestation are particularly acute in the tropics, and are rendered substantially unsolvable due to the absence of equipment and to unskilled labor which is universally employed.

It has now been found that individual packages of and materials, including semi-finished and finished garments which are subject to damage by weevil and moth infestation can be substantially minimized or even eliminated by packaging individual commodities or articles in vacuum-tight flexible containers and applying a vacuum thereto, which vacuum is maintained for at least the minimum period required to insure destruction of the infesting vermin, or to at least render them harmless.

The above and other desirable features of novelty and advantage are secured by utilizing vacuum-tight flexible containers of the type disclosed in my patents: 2,278,502 of April 7, 1942, and 2,281,187 of April 28, 1942, and providing such containers with an auxiliary vent and sealing aperture which is sealed after packaging and sealing of the mouth and pulling a vacuum on the container and its contents, a special means being provided for effecting a final seal of the auxiliary vent.

The improvements of the present invention will best be understood by reference to the attached drawings in which

Fig. 1 is an elevation of a flexible bag-like con-

2

tainer with a sealed mouth and an auxiliary aperture with a vacuum sealing device approximated thereto, and

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1 showing the sealing device apposed to and over the sealing vent.

Referring now to the drawings, there is shown a bag 10 having side walls 11, bottom 12, a flattened neck 13, a mouth seal 14 and an auxiliary vent 15 covered by apertured strips 16, 17, applied on either side of the aperture 15 and being provided in turn with a central aperture 18. The aperture 18 may be substantially microscopic and is adapted to be covered by a self-sealing patch 19. The bag 10 is preferably formed of laminated sheet material comprising an outer pervious cellulose sheet 11' and an inner impervious sheet or coating 11'' of thermoplastic, or plastic-coated metal foil, the laminae being mutually secured, all as set forth in my patents above identified. The patches or discs 16, 17, and 19, are desirably made of regenerated cellulose sheet material provided with a pressure adhesive on one surface thereof, the adhesive coated faces of discs 16 and 17 being in contact and the bottom surface of disc or patch 19 being coated with adhesive.

To secure a vacuum-tight, heat-sealed flexible package under conditions where heat-sealing equipment is not available, and particularly vacuum equipped heat-sealing machinery, the apparatus herein, which is hand operated, has been found to function satisfactorily. In operation, the bag 10, having been filled with an infested or potentially infested product, such as cashew nuts, rice, wheat, flour or other grains, has a pair of opposed sides brought together, as indicated at 13, and the mouth sealed, as indicated at 14, by any suitable means available such as a hot iron. A vacuum is pulled on the contents of the bag in the following manner; a flexible rubber cup or chamber 20 having a bottom edge 21, a central boss 22 and a draw-off tube 23, is provided with a hand-operated plunger 24 mounted on rod or piston 25, the latter being provided with a button or control knob 26. The tube 23 connects with a duct 30 having branched arms 31, 32, severally connected to gas line 33 and vacuum line 34 and controlled by valves 35, 36. The vacuum-pump, not shown, may be operated manually.

In operation, the cup or chamber 20 is forced down on disc 16 so that the latter, whose marginal edges are adhesively secured to outer sheet or lamina 11', is adhesively secured to the adhesive surface of inner disc 17, whose margins are adhered to the inner lamina or sheet 11''. With

the device 20 in this position, and plunger 24 lifted upwardly, as illustrated in Fig. 2, the valve 36 is opened, applying a vacuum through duct 23, device 20 and aperture 18, upon the interior of the bag 10 and its contents. When a sufficient vacuum has been pulled, the plunger 24 is depressed by knob or handle 26 and the disc or closure 19 forced into adhering, sealing contact with the patch or disc 16 so as to close off the aperture 18 and seal off the bag. Thereafter, the vacuum is broken and the sealing device 20 removed from contact with the bag. Where desired, a gas such as CO₂ may be initially forced into the bag, usually before the sealing patch 19 is applied over the vent 18. After the bag has been thoroughly gassed the head 20 is removed, the patch 19 tacked or attached to one side of the vent 18, as illustrated, and the device 20 is again applied and vacuum pulled in the usual manner.

The best results of the invention herein are attained by utilizing the cooperating, mutually adhering discs 16, 17, whose margins extend an appreciable distance beyond the aperture 15 in the wall of the bag. When these disc members 16, 17, are forced together, in and around the aperture 18, they seal off the edges of aperture 15 and prevent infiltration of air into vacuum chamber 20 through the normally air-permeable outer layer 11' of the flexible container.

It will be seen that there has been provided a novel method and apparatus for vacuum treating, hermetically sealed flexible containers without requiring special machinery installations and without requiring the use of electricity for electric heating or sealing elements.

As noted above, the desirable results of the present invention involving the packaging of materials normally subject to weevil and/or moth infestation by vacuum treating of the packaged products for a sufficient period can be obtained by the simple apparatus and method illustrated and described herein. Notably, the use of simple, adhesive-coated paper such as Scotch tape, give efficient results and permit the maintenance of vacuum for sufficient periods to insure the desired results. With the adhesive surfaces of the disc or closure patches comprised of self-setting thermoplastic materials incorporating suitable catalysts such as the organic peroxides, the sealing of the auxiliary vent may be made substantially as effective as that of the main seal of the mouth.

An additional feature of novelty and advantage of the invention herein lies in the application of the special package and method of packaging

to the shipment of tools, instruments and other devices and articles which are subject to the corrosive effects of moisture. The moisture vapor-transmission rate of the container walls and the closures for the auxiliary vent can be determined and suitable bag or container material used which exhibits the desired moisture vapor barrier characteristics.

With the improved container herein, the packages may be opened and reopened as often as desired with the mouth seals made in the usual manner and the auxiliary vent or vents sealed after pulling the desired vacuum. This feature alone makes the package highly adaptable for military use, as was the plural-ply envelope and vacuum package of my patents noted above.

What I claim is:

1. A flexible bag container for vacuum packaging, including a main body having a relatively long mouth portion having coincident plies, the outer ends thereof to be heat-sealed after the body is filled, one ply of the mouth portion being provided with an aperture, a two ply patch, one ply upon each side of the apertured mouth ply and covering the edges of the aperture thereof and each of the plies of the patch being provided with a vent opening registering with each other and the aperture, and a sealing patch to suction close the aperture of the outer ply of the two ply patch after a vacuum has been released.

2. A flexible bag container as claimed in claim 1 wherein the aperture of the mouth ply is sufficiently larger than the vent openings to permit a portion of one of the plies of the patch to enter same and contact the other ply of the patch.

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