April 17, 1962 W. E. TAYLOR 3,029,569

METHOD OF SEALING CONTAINERS

Filed June 4, 1959

Fig. 1

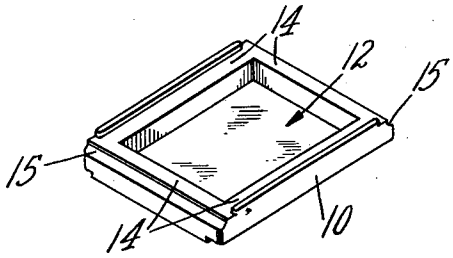


Fig. 2

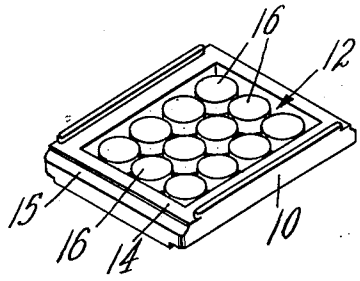


Fig. 3

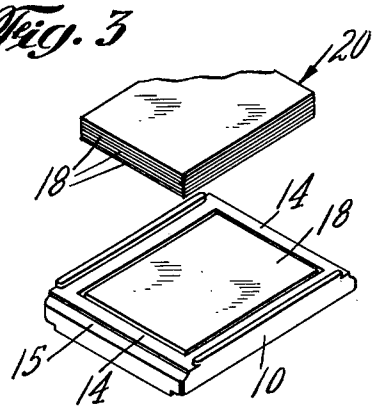


Fig. 4

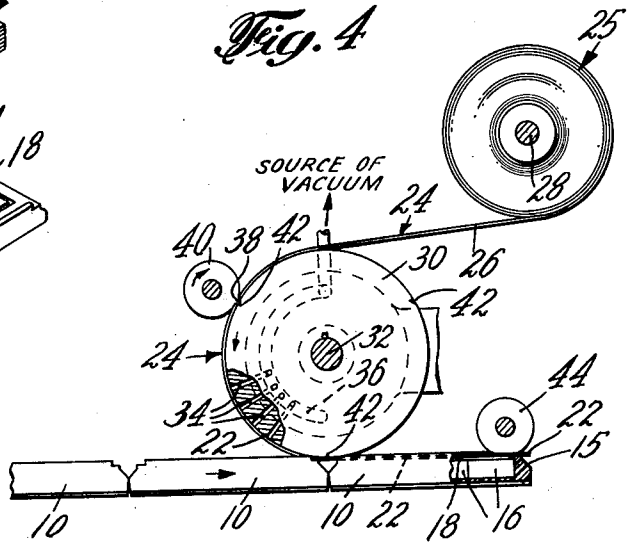


Fig. 5

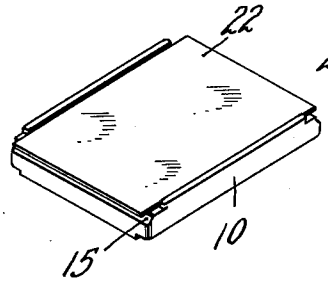
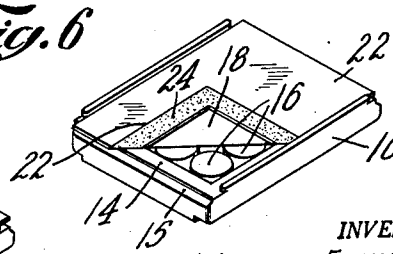


Fig. 6



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METHOD OF SEALING CONTAINERS

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2 Claims. (Cl. 53—14)

The present invention relates to a method of sealing containers and has particular reference to a method of forming and applying a flexible, resealable, protective diaphragm to the upper end of a container body.

In the packaging of certain hygroscopic tablets, it is desirable to provide a flat tablet-type container which permits controlled dispensing of a single tablet while at the same time providing protection for the tablets against atmospheric moisture and other contaminating and deteriorating influences. A container suitable for such products is disclosed in copending application Serial No. 817,781, filed June 3, 1959, in the name of Joseph Henry Fredette, et al., and entitled Container.

Such a container comprises a shallow tray-like body for receiving the tablets, the body being provided with a ledge which extends completely around its upper end and forms a seat for an imperforate sealing diaphragm which is impervious to atmospheric moisture and gases and thus provides the desired protection for the tablets. This diaphragm is adhered to the sealing ledge by a pressure sensitive adhesive which is carried on the lower surface of the diaphragm and which permits the diaphragm to be peeled back from a corner of the body to create a dispensing opening of a size which permits dispensing therethrough of a single tablet when the body is inverted. After the dispensing operation has taken place, the diaphragm is pressed back upon the body ledge to reseal the container until such time as the next tablet is wanted, whereupon the just described dispensing operation is repeated. Due to the fact that pressure sensitive adhesive remains permanently tacky, the sealing efficiency of the diaphragm remains effective throughout the normal life of the package.

In order to maintain the cost of the container at a minimum so that it can successfully compete with other types of containers, it is desirable that the mechanism necessary to apply the sealing diaphragm be as simple and inexpensive as possible and that spoilage be held to a minimum. In order to achieve these goals, the present invention contemplates a method of forming and applying a sealing diaphragm wherein the individual diaphragms comprise segments of predetermined length which are cut without waste from a supply roll of tape of a suitable width. In order to avoid the necessity of having to spot coat the pressure sensitive adhesive on the undersurface of the tape in patterns which match the configuration of the seating ledge, and then register such adhesive patterns relative to the cutter which severs the individual diaphragm segments from the supply roll, the present invention contemplates the use of tape having its undersurface completely coated with a film of the pressure sensitive adhesive.

To prevent the pressure sensitive adhesive which is carried on the central or medial portions of each of the cut tape segments from coming into contact with the tablets which are contained in the container body, a masking sheet of a size which just fits into the upper end of the body is positioned in the mouth of each container so that it rests upon the tablets contained therein prior to the application of the tape. Thus, when the adhesively coated tape segment is applied to the container mouth, the masking sheet interposes itself between the tablets and the adhesive carried on the tape. As a final step of the instant method of forming a sealing diaphragm, the marginal

portions of the applied tape segment are firmly pressed against the body ledge to form a secure adhesive bond therebetween, and the medial portion of the tape segment is pressed into contact with the masking sheet to combine these two parts into a unitary structure which becomes the completed sealing diaphragm. This latter result is made possible by the fact that the tablets serve as backing-up surfaces which insure contact between the two parts during the pressure applying step.

An object of the invention therefore is to provide a method of forming and applying a pressure sensitive sealing diaphragm to the upper end of a container in a simple and economical manner.

Another object is the provision of such a method which permits the use of a supply roll of tape which has a complete overall adhesive coating on one of its surfaces, so that the need for registering preprinted adhesive patterns is completely obviated.

Still another object is the provision of a method of forming and applying sealing diaphragms wherein a masking sheet is positioned on the product in the container and interposed between the product and an adhesive coated tape segment in order to prevent adhesion of the product to the tape segment.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

FIGURE 1 is a perspective view of an empty container body provided with a ledge for receiving a sealing diaphragm;

FIG. 2 is a view similar to FIG. 1 but showing the body with tablets in place therein;

FIG. 3 is a view showing the step of placing a masking sheet on the tablets in the open end of the body;

FIG. 4 is a view illustrating the method steps of cutting individual diaphragm segments from a roll of solidly coated pressure sensitive tape, positioning such segments on the upper ends of the container bodies, and applying pressure to the upper surfaces of the segments to firmly press them into engagement with the body ledges and with the masking sheets to form completed sealing diaphragms;

FIG. 5 is a perspective view of a container with a completed sealing diaphragm in place thereon; and

FIG. 6 is the perspective view of a container wherein the sealing diaphragm has been peeled back from the body ledge to form a dispensing opening at one corner of the body.

As a preferred and exemplary embodiment of the instant invention, the drawings illustrate a method of applying a sealing diaphragm to the upper end of a flat, tray-like container body **10** which is preferably formed of a suitable smooth-surfaced plastic material such as polystyrene, high density polyethylene, or the like. The body **10** is formed with a shallow contents-receiving recess **12** and a continuous flat horizontal ledge **14** which completely surrounds the recess **12** and is provided at its opposite ends with bevels **15**.

As the first step in the method invention, the recess **12** is filled with the container contents, here shown as individual tablets **16**, which extend up to a level slightly below the ledge **14**. After the container has thus been filled with the tablets **16**, a masking sheet **18**, preferably formed of a piece of inexpensive fibre stock is placed upon tablets, as seen in FIG. 3. The masking sheet **18** is preferably fed from a stack **20** of such sheets and placed in position upon the tablets in any suitable manner. As shown clearly in FIG. 3, the masking sheet **18** is slightly less in both length and width than is the recess **12** so that it fits easily into the recess and does not project onto the

ledge 14, and is preferably of such thickness that its upper surface is substantially coplanar with the ledge 14. After the masking sheet has been positioned, a sheet 22 of an impervious material such as aluminum foil, having its undersurface solidly precoated with a pressure sensitive adhesive 24, is placed in position on the upper end of the body 10 in substantial concentricity with the ledge 14. The sheet 22 preferably is cut from a supply roll 25 of pressure sensitive tape 26 which is mounted on a spindle 28 and has its inside surface completely coated with the pressure sensitive adhesive 24.

Pressure sensitive adhesive is widely known in the art and may be defined as an adhesive which is normally tacky and non-drying and which adheres by pressing without the need of activation by water, solvents or heat. Examples of such adhesives are disclosed in United States Patents 2,156,380, 2,328,058, 2,328,066, 2,410,053, 2,410,079 and 2,532,011. Pressure sensitive tapes formed with such adhesives have as their main characteristic the fact that they may be stripped from smooth nonfibrous surfaces which do not possess special chemical affinity for the adhesive without offsetting of the adhesive on such surfaces, and consequently are capable of being repeatedly separated from and re-united to such surfaces.

The leading end of the tape 26 is wound around a positively driven applicator wheel 30 in such manner that the tape surface carrying the adhesive 24 is disposed away from the wheel 30 and never comes into contact with it. The wheel 30 is keyed for rotation to a positively driven shaft 32, and the tape 24 is held tightly in engagement with the outer periphery of the wheel 30 by means of vacuum which is applied to its inside surface through a series of vacuum lines or bores 34 which are evenly spaced completely around the wheel and have their inner ends offset to bring them into alignment with an arcuate vacuum port 36 formed in a stationary vacuum manifold positioned against an end of the wheel 30. The port 36 is connected to a suitable source of vacuum in the usual manner.

As the tape 26 is carried around by the wheel 30, it is cut into body length sheets 22 by a rotary knife blade 38 which is carried in a cutting wheel 40 mounted tangentially to and rotated at the same peripheral speed as the applicator wheel 30. The circumferential length of the cutting wheel 40, as shown, equals the length of a body 10 while the circumferential length of the wheel 30 is preferably made a multiple (here shown as three) of such body length, so that when the two wheels are rotated in unison, the knife blade 38 successively enters cutting notches 42, which are formed at body length intervals around the periphery of the wheel 30, and thus cuts the tape 26 into the body length segments 22.

As seen in FIG. 4, the filled bodies 10 with the masking sheets 18 in position therein are passed beneath the applicator wheel 30 in end-to-end engagement and in substantially tangential relationship to the applicator wheel 30, and in registry therewith so that the leading edge of a cut sheet 22 is positioned immediately above the forward end of each body 10 as it passes beneath the axis of the wheel 30. The lineal forward speed of the bodies 10 is equal to the peripheral speed of the applicator wheel 30 and as a result, a sheet 22 is deposited on the body ledge 14 of each body 10 as it passes beneath the applicator wheel 30 with the adhesive 24 on the sheet 22 in contact with the ledge 14 and also with the upper surface of the masking sheet 18.

As noted in FIG. 4, the arcuate vacuum port 36 terminates at a position such that the vacuum in the bores 34 is cut off at the point of application of the sheet 22 to the body ledge 14, thus progressively releasing the sheet 22 so the adhesion between the ledge 14 and the sheet 22 strips the sheet 22 from the applicator 30.

A vent port (not shown) may be provided in the manifold to break the vacuum in the bores 34 at this point.

After the sheet 22 has thus been applied to the upper end of the body, its marginal portions are pressed against the body ledge 14 in order to insure firm engagement therewith, and its medial or central portion is pressed into contact with the masking sheet 18 so that the sheets 18 and 22 become laminated into a unitary diaphragm structure. These steps are preferably simultaneously accomplished by continuing the forward movement of the body 10 to bring it beneath a resilient pressure roller 44 (see FIG. 4) having a width at least equal to the width of the sheet 22. The roller 44 presses the adhesive coated marginal portions of the sheet 22 into firm engagement with the body ledge 14 and simultaneously presses its adhesively coated center portion into firm contact with the masking sheet 18, thereby uniting the two sheets into a unitary diaphragm. Pressured engagement between the sheets 18, 22 is made possible by the fact that the masking sheet 18 is supported and backed up by the tablets 16 during this pressure applying step. These pressure applying steps complete the method of the instant invention.

It will be clear that the order in which the several steps of the instant method are accomplished can be varied without departing from the scope of the instant invention. As an example, the tape 26 may be applied to the bodies 10 and thereafter severed into individual segments. Also, the pressure applying step may be accomplished simultaneously with the application of the tape of the body ledge 14. This could be easily done with the illustrated mechanism by forming the applicator wheel 30, with a resilient surface so that it will also function as a pressure wheel.

FIGURE 5 shows a container after the method steps have been completed. It will be noted that the marginal end portions of the diaphragm overhang the bevelled recesses 15 and thus may be easily grasped by the consumer. When the latter desires to dispense a tablet from the sealed body, he grasps a free end portion of the diaphragm and peels the diaphragm back along the body ledge 14, preferably from a corner of the body, to create a triangular dispensing opening (see FIG. 6) through which a single tablet drops when the container is inverted. Thereafter, the diaphragm is pressed back into engagement with the ledge 14 in order to reseal the body. Since the pressure sensitive adhesive 24 remains permanently tacky, this dispensing operation can be repeated until the tablets 16 have been completely dispensed from the body 10.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the steps of the method described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the method hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The method of sealing flat containers each having a shallow rectangular recess therein and filled with a plurality of similar discrete substantially rigid articles to permit controlled individual dispensing of said articles from the container, said recess being surrounded by a flat peripheral ledge of lengthwise dimension less than that of said container, comprising placing a masking sheet within said recess of each of said containers over the exposed upper surface of said articles to protect the same and to be supported solely thereby, said masking sheet substantially filling said recess inwardly of said surrounding peripheral ledge, advancing the containers in abutting end-to-end relation whereby a gap is formed between the end ledges of adjacent containers, applying an outer protective strip material having a coating of pressure sensitive adhesive thereon to said advancing containers over said masking sheet and said flat surrounding peripheral ledge of each container and over the gaps between said end ledges to close said filled containers and protect said

articles, pressing said strip material into adhesive contact with said ledges and said supported masking sheets, and severing said strip material into container-length sheets to provide end portions of said sheets overhanging said end ledges, whereby corresponding corner portions of said protective sheet and said adhesively secured masking sheet may be manually lifted by an overhanging end portion of said protective sheet to permit individual dispensing of said articles from a corner of said container recess while preserving the non-adhesive contact of said masking sheet with the articles.

2. The method of claim 1 including feeding said material by suction from a supply roll thereof during applying of the strip material to the containers, and wherein said severing of said strip material is performed during suction feeding thereof.

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