April 2, 1940. E. C. MERRILL 2,196,021

DESICCATING DEVICE

Filed Dec. 29, 1937

FIG. 1.

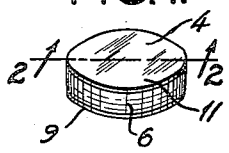


FIG. 2.

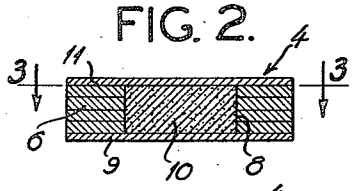


FIG. 3.

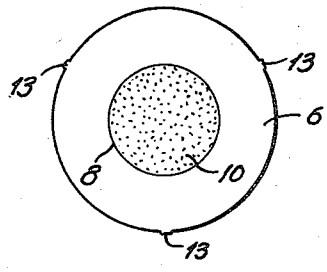


FIG. 4.

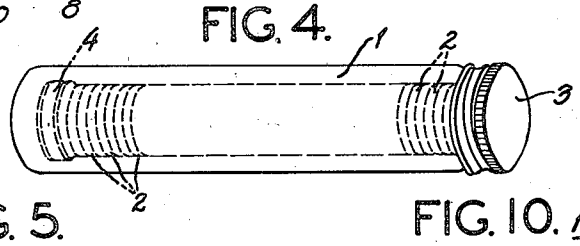


FIG. 5.

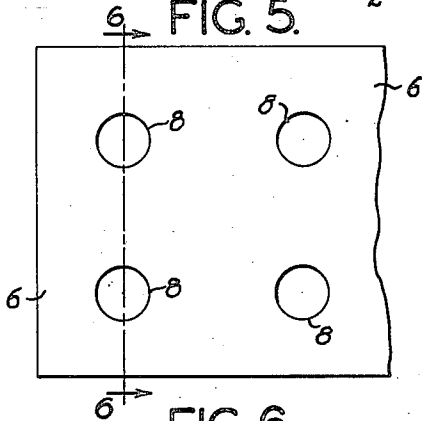


FIG. 10.

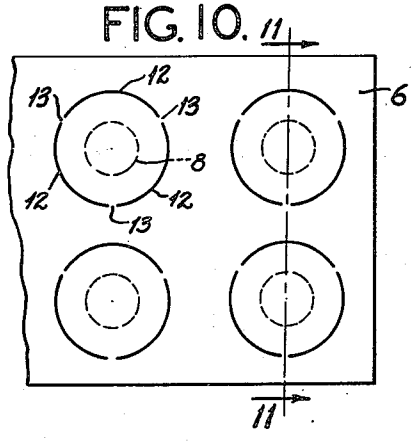


FIG. 6.

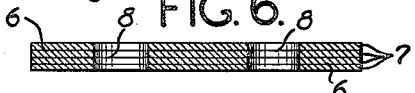


FIG. 7.



FIG. 8.



FIG. 9.

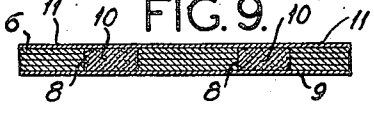
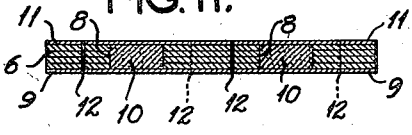


FIG. 11.



Edward C. Merrill,
Inventor,
Delos F. Haynes,
Attorney.

Patented Apr. 2, 1940 2,196,021

UNITED STATES PATENT OFFICE

2,196,021

DESICCATING DEVICE

Edward C. Merrill, West Roxbury, Mass., assignor to United Drug Company, Boston, Mass., a corporation of Delaware

Application December 29, 1937, Serial No. 182,228

3 Claims. (Cl. 183—4)

This invention relates to desiccating devices, and with regard to certain more specific features, to desiccating devices in the form of cartridges adapted for inclusion in packaged articles, where it is desirable to maintain said articles in a dry condition.

Among the several objects of the invention may be noted the provision of a desiccating device of the class described which is provided with a charge of a dehydrating agent, the device as a whole being provided with at least one porous wall surrounding the dehydrating agent so that the dehydrating agent is permitted to absorb moisture from the surrounding atmosphere, thereby to maintain said surrounding atmosphere in a dry condition; the provision of a desiccating device of the class described of a size and shape readily adapted for inclusion in packages of pharmaceutical products, for example, which are undesirably hygroscopic; and the provision of a desiccating device of the class described which is economical to manufacture and use. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts, which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a perspective view of a desiccating device embodying the present invention;

Fig. 2 is a cross section taken substantially along line 2—2 of Fig. 1;

Fig. 3 is a section taken substantially along line 3—3 of Fig. 2;

Fig. 4 is a perspective view of a filled container, showing the manner in which a desiccating device in accordance with the present invention is used;

Fig. 5 is a plan view of a blank, showing an initial stage in the manufacture of the desiccating device of Fig. 1;

Fig. 6 is a cross section taken substantially along line 6—6 of Fig. 5;

Figures 7, 8 and 9 are cross sections similar to Fig. 6, showing progressive stages in the manufacture of the desiccating device;

Fig. 10 is a plan view similar to Fig. 5, showing a substantially final operation in the manufacture of the desiccating device; and,

Fig. 11 is a cross section taken substantially along line 11—11 of Fig. 10.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

Pharmaceutical manufacturers have heretofore had considerable difficulty in connection with the packaging of products that are of a hygroscopic character. The difficulty becomes pronounced, for example, when the product is of such character that the ultimate consumer uses only a portion of it at only one time from the container in which it is packaged, for each time said container is opened, access of the presumably relatively damp atmosphere to the contents of the container is permitted, and the contents thus become progressively wetter as the container is repeatedly opened and closed.

This difficulty is particularly pronounced, for example, in connection with packages of hygroscopic tablets, such as the alkaline effervescent tablets currently in popular demand. It is the custom of the pharmaceutical industry to package say twenty or twenty-five of such tablets, in stacked relationship, in a tubular glass container, with a screw-cap at one end. Such a container, for example, is indicated at numeral 1 in Fig. 4. Numeral 2 in Fig. 4 indicates the tablets, while numeral 3 indicates the screw-cap for the tubular container. Containers such as that illustrated in Fig. 4 can readily be packaged, at the manufacturing establishment, under dry conditions, and the cap 3 placed on the container in such manner as to maintain the dry condition within the container up to the time that the ultimate consumer first opens it. However, after the initial opening by the ultimate consumer, there has heretofore been provided no means for taking care of the repeated periods of access of relatively damp atmosphere to the contents of the container, and when it is considered that it is the usual custom of the user to open the container and close it once for each tablet withdrawn from the container, it will readily be seen that, before the last tablets in the container are used, they have been permitted to come into contact with a considerable volume of atmospheric moisture. To certain pharmaceutical products, this atmospheric moisture is distinctly deleterious, and its access to the products should be prevented.

In order to be readily applicable to present methods of manufacturing and packaging products of the class here concerned, any desiccating device must be capable of being fitted into the

existing routines, in order to avoid unduly increasing the cost of the packaged product. The present invention provides a desiccating device which is, accordingly, readily adapted to present manufacturing and packaging routines, and furthermore, a desiccating device which is economical to manufacture.

Referring now more particularly to Fig. 1, there is illustrated a desiccating device such as provided by the present invention. Broadly speaking, the desiccating device of the present invention comprises a cartridge indicated by numeral 4, which is generally of circular shape, although not necessarily so. The cartridge 4 is provided with a filling, or charge, of a suitable dehydrating agent, such as indicated at numeral 10 in Fig 2. In general, it has been found preferable to make the cartridge 4 a little smaller in diameter than the inside diameter of the container in which it is to be used, so that it fits easily therein, and to limit the thickness of the cartridge to the minimum possible dimension, in order that it may occupy as little space as possible within the container. On the other hand, for purposes of distinction from the tablets packed within the container, it is desirable that the cartridge 4 be made readily distinguishable from said tablets, as by making it of a slightly larger diameter, or of a slightly greater thickness, or of a different color. This is in order to prevent the consumer from confusing it with one of the tablets.

Referring now more particularly to Figures 5 through 11, numeral 6 indicates a suitable blank, which, as shown in Fig. 6, is made up of a suitable number of cardboard or like paper material laminae 7, secured together flatwise by a suitable adhesive material. The thickness of the final cartridge may be determined by selecting the proper number of laminae 7 for the blank.

As a first stage of manufacture, spaced holes 8 are punched through the blank 6. The spacing of the holes 8 depends upon the size of the ultimate cartridge to be prepared, as will be evidenced from the further description of the method hereinafter given.

A backing cover sheet 9 (see Fig. 7) is now affixed with a suitable adhesive to one face of the punched blank 6. The backing sheet 9, it will be seen, transforms each of the holes 8 into a cup-shaped recess. Preferably, the backing sheet 9 comprises a porous material, such as blotting paper, although this backing sheet 9 may be a non-porous material, such as cardboard.

The next step in manufacturing the cartridges is indicated in Fig. 8, where it will be seen that the holes 8 have all been filled with a powdered dehydrating agent 10.

The next step, which is shown in Fig. 9, comprises affixing to the upper surface of the blank 6, as with adhesive, a cover sheet 11. The cover sheet 11 is ordinarily made of a suitable porous material, such as blotting paper. It is desirable that both the backing cover sheet 9 and the cover sheet 11 be of such porous material, but, in some instances, satisfactory results may be achieved if only one of these two elements is porous, and the other relatively non-porous.

The next step is indicated in Figures 10 and 11. Here it will be seen that the blank of Fig. 9 has been subjected to a punch operation, whereby a series of adjacent partial circular cuts 12 are provided around each of the now-filled holes 8. The cuts 12 extend entirely through the assembled blanks, as indicated in Fig. 11, and serve to relieve the finished cartridge from the blank material, except for relatively small connecting portions 13. If the finished cartridge is to be of circular shape, the cuts 12 together comprise almost a complete circle, as illustrated in Fig. 10.

For storage purposes, it is preferable to leave the cartridges in the Fig. 10 stage of their manufacture, until they are to be used. For use, the individual cartridges can be readily removed from the strip merely by the application of sufficient pressure to break the small connecting portions 13, whereupon the cartridge is relieved from surrounding material.

It will readily be seen that the method described can be carried out with facility on a continuously advancing strip of blank material. The strip can readily be so guided that the punches which make the cuts 12 are automatically located and timed so that the cuts 12 are properly spaced from the concealed filled openings 8. In such a continuous method of manufacture, the cost of the individual cartridges may be reduced to a minimum.

In packaging procedures, the preferred method is to first introduce one of the cartridges into the empty container, so that it is positioned at the bottom of said container, and then the packaged product is filled in on top of the cartridge. In this manner, the cartridge 4 will automatically remain in the container until the product is all removed therefrom.

In the finished cartridge, the laminated blank material 6 comprises the body of the cartridge, while the sheet material 9 and 11 comprises the two covers of the cartridge. All elements are preferably in permanently assembled, non-openable relationship.

The particular dehydrating agent 10 to be used depends upon the material to be packaged, and upon the degree of desiccation at which it is desired to maintain said products. These factors likewise determine the amount of dehydrating agent to be used. As suitable dehydrating agents for various types of products, I have satisfactorily used anhydrous calcium sulphate, anhydrous aluminum chloride, anhydrous calcium chloride, silica gel, anhydrite (aluminum trioxide), and other ordinary dehydrating agents.

It has been found satisfactory, for example, in connection with the packaging of effervescent alkalizing tablets, to use a cartridge containing of the order of one-half gram of anhydrous calcium sulphate for each twenty-five tablets packaged.

The action of the desiccating device or cartridge in a package is easily understood. Each time the package is opened, a certain amount of relatively damp atmospheric air is admitted to the package. The dehydrating agent in the cartridge has a preferential affinity for moisture over the product packaged in the container, so that when the cap is again applied to the container, said dehydrating agent quickly absorbs all the moisture admitted to the container, thus leaving the interior atmosphere of the container dry. The moisture is absorbed through the porous material covers 9 or 11 of the cartridge, or both. It is thus seen that shortly after each time the container is opened, the air within said container will have been restored to a dry condition, within the required degree.

By suitably calculating the amount of dehydrating agent in the cartridge, such a condition of dryness can be maintained in the container, up to the time the last of the product therein is used.

Through the use of a porous material such as

blotting paper for either of the covers 9 or 11 of the cartridge, or both, it is entirely feasible to use a finely powdered dehydrating agent in the cartridge. The porosity of the blotting paper is such that no ordinary powder, no matter how fine, will penetrate therethrough and contaminate the packaged product. This is of particular importance when it is considered that the cartridge is ordinarily to be used with pharmaceutical preparations, which should be protected from contamination of all sorts.

The cartridge described, in addition to performing the desiccating function, also serves as a resilient cushion in the container, and to a greater or less extent takes over the resiliency function of the wad of cotton usually placed in packages of this type to prevent the contents from breaking during shipment.

The cheapness of the cartridge makes it economically feasible to throw it away after the container with which it has been packaged is emptied.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A dehydrating device comprising a hollow disc-like cartridge, a dehydrating agent within said cartridge, and a porous material cover closing said cartridge, said cover comprising a porous sheet material of the character of blotting paper.

2. A desiccating cartridge comprising a disc-like body formed of a plurality of laminae of paper-like material adhesively secured together, said body having an opening extending therethrough, covers on each side of said body adhesively secured thereto and closing the ends of said opening, and a dehydrating agent contained in said opening, at least one of said covers comprising a porous material of the character of blotting paper.

3. A desiccating device comprising a disc-like cartridge having a hollow body formed from laminated cardboard, a powdered dehydrating agent within said body, and covers on each side of said body permanently enclosing said dehydrating agent, at least one of said covers being made of a porous material of the character of blotting paper.

EDWARD C. MERRILL.