Jan. 30, 1945. C. E. JOHNSON 2,368,140

PACKAGE AND WRAPPER

Filed Feb. 5, 1941

Fig. 1.

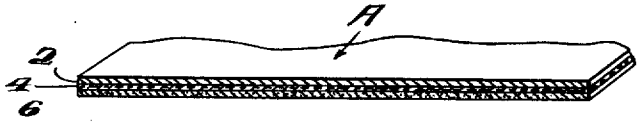


Fig. 2.

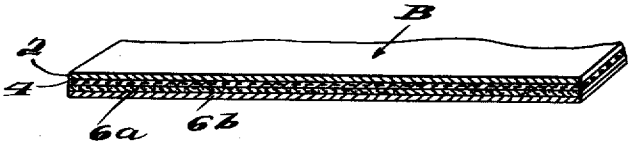


Fig. 3.

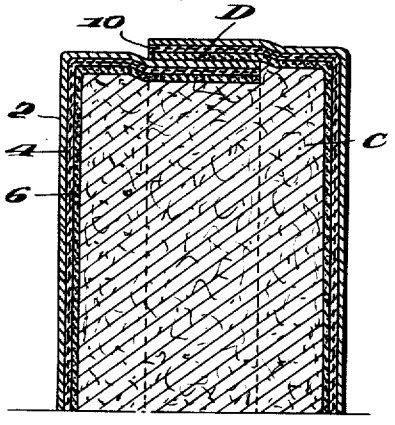
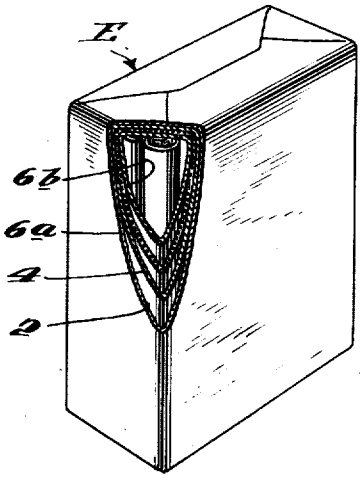


Fig. 4.



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2,368,140

UNITED STATES PATENT OFFICE

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PACKAGE AND WRAPPER

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Application February 5, 1941, Serial No. 377,557

5 Claims. (Cl. 312—31)

This invention is directed to a package in which, by reason of a novel wrapping, the contents of the package are kept moist.

The problem of supplying a measured quantity of water per day to a package was disclosed in my copending application Serial No. 287,165, filed July 28, 1939, which has resulted in Patent No. 2,329,908, dated Sept. 21, 1943 wherein control of the quantity of water supplied by the wrapping was obtained by balancing adhesive hygroscopic agents to a desired point of water vapor pressure. The present invention discloses a novel and more practical means of accomplising the desired control of water vapor feed to the package by using a metering layer between the water reservoir and the goods packaged. Dependence upon a sharp hygroscopic balance in the water bearing adhesive is eliminated thereby and control is obtained by regulating the water vapor permeability of the sheet material between the water bearing adhesive and the goods packaged adjacent the opposite side of this metering layer.

The new device is more clearly understood by reference to the attached drawing in which Fig. 1 is a cross-sectional view of the novel wrapper;

Fig. 2 is a cross-sectional view of a modified form of the wrapper shown in Fig. 1;

Fig. 3 is a cross-sectional view through a package wrapped with the wrapper of Fig. 1; and

Fig. 4 is a perspective view, partly in section of a cigarette package having the wrapper of Fig. 2.

Wrapper A of Fig. 1 is composed of a layer of tinfoil 2 coated with a layer of a water-bearing substance 4 covered by a moisture metering layer 6.

The layer 2 can consist of any moisture-impervious material. It should be noted, however, that the imperviousness of this material is greater than that ordinarily contemplated in the art. For example, such materials as Cellophane, aluminum foil and wax paper are ordinarily thought to be moisture-impervious, but they are not moisture-impervious to the degree contemplated by this invention. Tinfoils, lacquered aluminum foils, heavy lacquered papers, sheets of resinous type films, or any other materials which are preferably flexible and having imperviousness greater than that which will be discussed for the layer 6, are satisfactory for the layer 2. Included among the satisfactory materials, when flexibility is not needed, are waterproofed woods and cardboards, and sheet metals of gauges at least equal to those used for making cans.

Layer 4 consists of a water-bearing substance which has a vapor pressure at least as great as that of the article to be packaged, and which has the quality of holding a quantity of water which is available for supplying water to the package. In other words, the water-bearing substance must be capable of releasing enough water to replace that evaporated from the package during the life of the package, and while this rate of release must be greater than the rate of moisture escape from the package, it should not be much greater than that.

Such water-bearing substances which have the additional desirable characteristic of being both flexible and adhesive are carbohydrates in the form of sucrose solutions, invert sugar, glucose, other sugar solutions or aqueous solutions of organic substances, and gelatins, including animal glues mixed with adhesive substances. Obviously whatever is used in packing comestibles must be non-toxic and non-odoriferous. It is noted, however, that the selection of the water-bearing substance depends upon the quantity of water and its vapor pressure with respect to the material to be wrapped, and that the above materials are merely illustrative and not inclusive of all materials which may be used regardless of flexibility. Combinations of various ingredients may be used in preparing the water-bearing substance so that the substance will have the required minimum vapor pressure and a rate of evaporation such as to make sufficient water available for entry into the interior of the package. Examples of compositions which have been prepared particularly for the supply of moisture to cigarette packages are given below only by way of example:

		Per cent
(1)	Invert sugar, 87 Brix	55.6
	Water	14.0
	Gelatin, ossein type, 125 bloom	7.0
	Dicalite "L" grade	23.0
	10% Aerosol OT solution	.4
		100.0
(2)	Invert sugar, 87 Brix	52.60
	Water	14.24
	Gelatin, ossein type, 125 bloom	7.00
	C. P. glycerin	3.00
	Dicalite "L" grade	22.76
	10% Aerosol OT solution	.40
		100.00
(3)	Glucose, 45 Bé	57.38
	Water	12.22
	Gelatin, ossein type, 125 bloom	7.00
	Dicalite "L" grade	23.00
	10% Aerosol OT solution	.40
		100.00
(4)	Glucose, 45 Bé	54.29
	Water	12.56
	Gelatin, ossein type, 125 bloom	7.00
	C. P. glycerin	3.00
	Dicalite "L" grade	22.75
	10% Aerosol OT solution	.40
		100.00

Layer 6 functions in the nature of a valve to meter the rate of flow of moisture from the layer 4 to the interior of a package. It is clear that if the vapor pressure of the packaged article drops because of a loss of moisture, a vapor pressure head will be created in the layer 4. The rate of escape of moisture from the layer 4 into the package in order to balance the rate of moisture escape from the package is controlled by the layer 6. The importance of the layer 6 lies in the fact that it must meter almost imperceptably minute quantities of water at a relatively steady rate from the layer 4 into the package. As for example, in a cigarette package approximately only .00017 gram of water per hour should be released from the layer 4 into the interior of the package. Thus the layer 6 must allow only this much water to pass through it regardless of changes in the vapor pressure of the layer 4. Moreover, this quantity of water is for the surface of layer 6 exposed to the interior of the package, and thus the quantity of water per hour passing through a square inch of the surface of layer 6 is exceedingly small. This rate of flow, moreover, must continue for the life of the packaged article, that is, between the times of packaging and consumption of the goods.

Layer 6 can exist in many forms such as a sheet of Cellophane, sheets of various synthetic materials, coatings of resins, natural or synthetic, or any other material possessing the properties of insolubility in the presence of the quantities of moisture experienced in the package, and perviousness when at least in the form of a thin film spread upon layer 4. In every instance, the rate of water vapor flow through layer 6 must be greater than the rate of flow of moisture through the layer 2, which determines the criterion for the relative imperviousness of layer 2, and at the same time the perviousness of layer 6 must be great enough to permit moisture to pass through in quantities sufficient to balance approximately the evaporation of moisture from the packaged article.

In Fig. 2 a particularly practical form of the invention is illustrated. The wrapper B is composed of the layers 2 and 4 which are similar in all respects to those described for Fig. 1. However, the moisture metering layer shown as 6 in Fig. 1 is shown in combined form in Fig. 2. Layer 6 of Fig. 1 is layer 6*a* of Fig. 2. Layer 6*b* is a pervious sheet material such as paper on which is deposited by suitable means a film 6*a* which possesses the requisite moisture metering properties. Thin films of synthetic plastics, as for example those known under the trade names "Pyroxocote" and "Vinylite" are especially suitable for the layer 6*a*, the effect of which is to produce the porosity of the usually more pervious layer 6*b*. It is sometimes desirable to actually impregnate the layer 6*b* with the substance of layer 6*a* so that a more homogeneous effect is obtained. The moisture metering effect of the 6*a*, 6*b* combination of Fig. 2 is equivalent to that of layer 6, Fig. 1 but is for certain purposes a more economical means of achieving the desired result.

The application of the wrapper A, Fig. 1, to a package is illustrated in Fig. 3. A moisture-bearing material C is enclosed within wrapper A whose edges are overlapped to form the joint D. Water evaporates from the package through joint D, and additional water is added to the contents C from the layer 4 of wrapper A. A surprising function of the wrapper is that an insignificant amount of water is lost from the evaporation of water through the edge 10 exposed to the atmosphere. This is apparently because it is easier for the water to pass through the layer 6 than through the thickness of substance in layer 4 to edge 10.

In Fig. 4 the wrapper B of Fig. 2 is shown applied to a cigarette package E. Thus wrapper B has been substituted for the usual metal foil and inner paper lining normally employed in the wrapping of cigarettes. In fact, from outward appearances, the wrapper B is indistinguishable from the heretofore used wrappers. As moisture is lost from the package through the joints in the wrapper, it is replaced at substantially the same rate by water from the layer 4. As the quantity of water in layer 4 is great enough to make up for the loss in water from the cigarettes over the normal marketing time for the cigarette package, the cigarettes are maintained at an optimum moisture content for freshness.

In the packaging of materials using the novel wrappers of Figs. 1 and 2, it is usually desirable to guard against any change in taste in the materials due to the inclusion of additional water in the package. The substances set forth in the examples give up odorless and tasteless moisture, and the possibility of taste impurities being emitted from layer 6*b* of Fig. 2 is substantially stopped either by purification of the material forming this layer, or by impregnating the layer with a tasteless moisture insoluble substance such as a synthetic resin, so that the water soluble unpalatable impurities in layer 6*b* are not dissolved out by moisture passing through the layer. However, it is within the contemplation of this invention to deliverately flavor the substance 4 in order to give the contents of the package a predetermined flavor or odor. For example, mentholated cigarettes can be kept fresh both in moisture and flavor by adding menthol to the substance in layer 4. Actually the wrapper as a whole is quite waterproof so that the principal water escape from the package is at the joints or seams. This relative waterproofness is achieved in part by the layer 6, and especially if this layer is composed of a synthetic resin. The invention is distinguished from the ordinary use of resin films for waterproofing purposes by the fact that the resin layer functions as a valve to meter the flow of predetermined quantities of water from the water-bearing substance incorporated in the wrapper.

Having described the means by which the objects of the invention are obtained, I claim:

1. In a package of cigarettes, a wrapper comprising an outer layer of substantially moisture-impervious metal foil, an intermediate adhesive layer containing a sugar solution, the vapor pressure of which is at least as great as that of the cigarettes, said intermediate adhesive layer serving to bind said outer layer to an inner layer, said inner layer being composed of paper coated with a thin film of resin and having a perviousness which permits the passage of water therethrough at approximately the same rate as the escape of water from the package.

2. A wrapper comprising an outer layer having substantial moisture-imperviousness, an inner layer composed of a resin coated paper of preselected moisture-perviousness, and an intermediate adhesive layer binding said outer to said inner layer and composed of an aqueous sugar solution.

3. In a package composed of a moisture-bearing article enclosed at least in part by a wrap-

per, said wrapper comprising a substantially water-impervious outer layer, an intermediate layer of plastic, adhesive, hydroscopic material the vapor pressure of which is at least as great as that of said moisture-bearing article, and an inner layer composed of a paper coated with a thin film of water resistant material and having a perviousness which permits the passage of water therethrough at approximately the same rate as the escape of water from said package.

4. In a non-hermetically sealed package, a wrapper composed of an outer layer of substantially moisture-impervious material, an intermediate layer comprising a carbohydrate in aqueous solution, the vapor pressure of said solution being at least as great as that of the commodity within the package, and an inner layer composed of moisture-pervious paper coated with a thin film of resin and having a perviousness which permits the passage of water therethrough at approximately the same rate as the escape of water from the package.

5. A combined sheet material as in claim 2, said inner layer comprising a substantially water insoluble resinous product.

CECIL E. JOHNSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,368,140. January 30, 1945.

CECIL E. JOHNSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 58, for "produce" read --reduce--; and second column, line 36, for "deliverately" read --deliberately--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of April, A. D. 1946.

(Seal)

Leslie Frazer
First Assistant Commissioner of Patents.

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4. In a non-hermetically sealed package, a wrapper composed of an outer layer of substantially moisture-impervious material, an intermediate layer comprising a carbohydrate in aqueous solution, the vapor pressure of said solution being at least as great as that of the commodity within the package, and an inner layer composed of moisture-pervious paper coated with a thin film of resin and having a perviousness which permits the passage of water therethrough at approximately the same rate as the escape of water from the package.

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