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T. R. BAXTER

2,498,197

INFUSION PACKAGE AND METHOD OF MAKING SAME

Original Filed May 25, 1942

Fig. 1

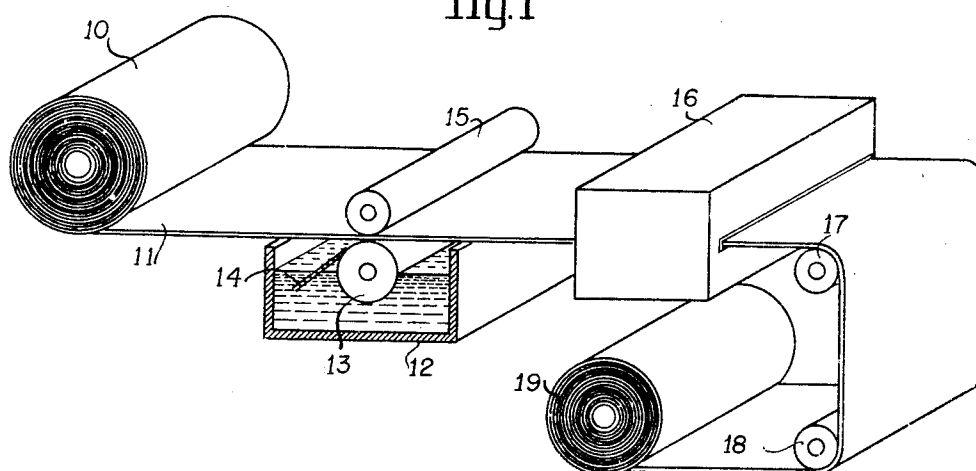


Fig. 2

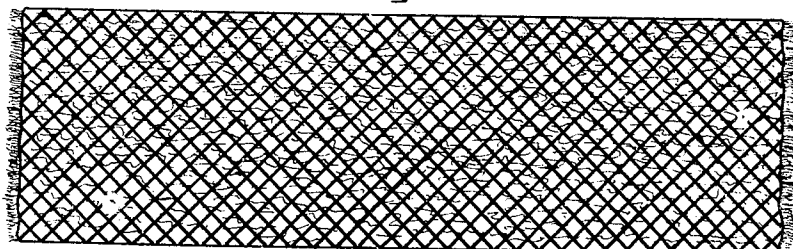


Fig. 3

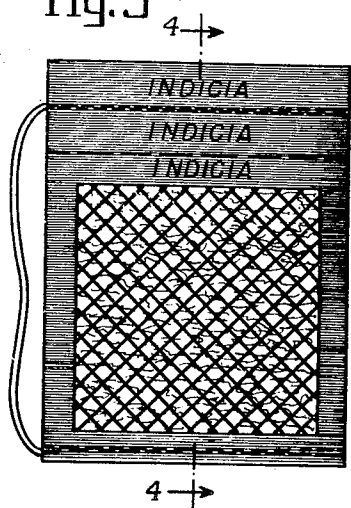
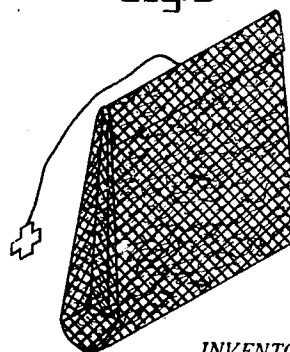


Fig. 4



Fig. 5



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2,498,197

INFUSION PACKAGE AND METHOD OF
MAKING SAME

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Continuation of application Serial No. 444,454,
May 25, 1942. This application January 9, 1948,
Serial No. 1,336

10 Claims. (Cl. 99—77.1)

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The present invention relates to improvements in the manufacture of infusion packages made from filter papers. More particularly, it pertains to an improved type of infusion package and method for its manufacture especially adaptable for use in the food packaging industry as, for example, in the manufacture of tea balls or the like.

Heretofore it was customary to make tea balls from a standard type of filter paper made from special basic raw materials, many of which were imported. In most cases special equipment is used in the manufacture of such filter paper and all of these considerations add considerably to the cost which consequently has made such paper expensive. These filter papers, while ideally suited for infusion purposes, possess wet strength characteristics far in excess of that which is necessary for use in the manufacture of tea balls and additionally, because of the importation costs of the materials as well as the manufacturing costs, the production of such products is therefore accompanied by economic disadvantages which tend to make their use prohibitive and unwarranted in certain instances where less expensive materials will suffice.

Generally, it is an object of the present invention to overcome these disadvantages by providing an infusion package of filter paper wherein a standard or semi-standard light weight paper can be utilized by overprinting the same with a network of lacquer to provide such paper with a tensile strength which approaches that of the conventional type filter paper and which also provides the added advantage of elasticity.

Principal objects of the present invention are to provide a sturdy and unique infusion package characterized by web walls of an inexpensive porous paper to which is applied a suitable lacquer to strengthen it against deterioration in hot water and in such manner as still to allow proper infiltration of the soluble principles of a contained infusion commodity, such as tea, into the hot water; and the provisions of a novel and efficient method of making the same.

More specifically, it is an object of the present invention to provide infusion packages formed from inexpensive porous paper having relatively short interlaced cellulosic fibers with crosscross lines of lacquer of a water-repellant nature prop-

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erly spaced so that they tend to contact the fibers at approximately two points on their lacquer exposed surfaces to strengthen the structure sufficiently to permit such papers to be employed for use in the formation of such infusion packages, for example tea bags.

Another object of the invention is to provide such infusion bags made from paper strengthened with a type of lacquer that is suitably thermoplastic so that the bags subsequently made therefrom can be fabricated by heat-sealing the open ended portions in lieu of other mechanical devices for fastening the same to confine the infusion commodity therein.

Other specific objects of the invention are the provision of an infusion package formed from such a web having deposited thereon spaced apart continuous lines of thermoplastic water-repellent lacquer adapted to prevent distintegration of the paper; to provide such packages made from a web having applied thereto amounts of such lacquer sufficient to permit heat-sealing as well as thermo-elasticity; to provide a lacquer coated web infusion package having infusion areas in which the rate of filtration is on a par with that of present conventional standard filter papers; and, to produce such packages from paper webs having thereon, as a porous deposit, sufficient amounts of water-repellent thermoplastic lacquer to hold the fibers together when immersed in hot water and which will be odorless, tasteless and non-toxic under these prescribed conditions.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the several steps and the relation of one or more of such steps with respect to each of the others and the article possessing the features, properties, and the relation of elements, which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a diagrammatic representation in perspective of a preferred form of apparatus illustrating a method of reinforcing porous webs

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with lines of lacquer to be used in the formation of infusion packages of the present invention;

Fig. 2 is a plan view depicting a portion of such a web illustrating a preferred form of design of lacquer applied thereto;

Fig. 3 is a plan view of a heat-sealed tea bag made from a web such as shown in Fig. 2;

Fig. 4 is a transverse sectional view taken along the lines 4-4 of Fig. 3 looking in the direction of the arrows further illustrating the heat-sealed type of tea bag; and

Fig. 5 is a perspective view of a mechanically closed form of bag utilizing the same type of infusion web.

Referring more particularly to Fig. 1 of the drawing an improved type of infusion or filter material is shown being formed from a roll of inexpensive porous fibrous cellulosic type of sulphite paper indicated generally at 10. This roll unwinds to form a web 11 and is passed through an intaglio unit having a tank 12 containing a bath of heat-sealing lacquer in which rotates an etched cylinder 13. A conventional doctor blade 14 is positioned to remove excess material from the roll 13. Above the cylinder 13 there is positioned an impression roller 15 which coacts with the latter as an aid in effecting a deposit of the lacquer along the face of the web. The web continues its onward travel with this deposit of lacquer on its under side and passes through a suitable type of drying chamber 16 which effects the removal of solvents from the lacquer whereupon the web continues its travel for example about suitable idler rollers 17 and 18 respectively so that it may ultimately wind upon itself on roll 19.

With respect to the above mentioned paper we recommend as being preferable a 100 per cent bleached kraft sheet of approximately 12 to 13 pounds in weight which has been thoroughly washed to be sure it is both odorless and tasteless. While this is practically a standard sheet, the fibers have been "opened up" as far as possible without sacrificing too much of its strength. Such a paper is at present readily available from numerous domestic paper makers capable of producing this type of paper. It is desirable that such paper also be non-toxic and should have a porosity of an order such that the speed of filtration is comparable with that of the paper used in conventional practice.

With respect to the lacquer which is to be used in accordance with the present invention it is important to note that it should have the highest possible film strength since its function is to tie the fibers of the paper together and bind them throughout the tea-making operation. While nitro-cellulose base lacquers as well as ethyl cellulose base lacquers may be used, I prefer to use and recommend a vinyl-resin solution in a low boiling solvent. A satisfactory example of a commercial lacquer of this type at present available is produced by Gordon Lacey and is known to the trade as G-357-C-32. This resin is probably a copolymer of vinyl acetate and vinyl chloride. As above indicated, this lacquer should also be non-toxic, odorless, tasteless and thermoplastic, and when subjected to hot water should be water-repellent and have thermo-elastic properties. It should also possess sufficient tensile strength to hold the fibers of the paper together when subjected to boiling water. Many materials can be used which would meet these specifications but many of them at present are generally considered too expensive while others retain their residual solvent too tenaciously for economic and practical

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solvent elimination purposes. Solvent elimination is very important as any solvent retained by the lacquer solids will impart taste and odor to tea brewed from paper coated in accordance with the principles of the present invention as hereinafter described. The substantially complete elimination of all solvent vapors or residual solvents from the film of lacquer applied on the paper is of importance and the drying operation above referred to in connection with the diagrammatic representation on the drawing preferably consists of an application of live steam and air at high velocity.

With respect to the nature of the lacquer application with which the web is to be provided, various designs therefor may be utilized. Standard gravure etched cylinders have a screen pattern of a cellular structure throughout the etched area. In applying a "size" coating to one or both sides of the paper with an etched gravure cylinder of the order of 100 to 150 line screens a strengthened infusion web can be obtained exposing tiny infusion areas. However, in accordance with the principles of the present invention, it is preferred to use a series of continuous crisscross parallel lines of lacquer.

To obtain an etched cylinder with such a design it is preferred to eliminate the use of a screen because of difficulty in obtaining a continuous line. A cylinder having the desired crisscross lines etched without the use of any screen and its resulting cells will give the desired results. Since the fiber lengths of the less expensive papers are comparatively short properly spaced crisscross lines made without a screen will give a continuous line and are adapted to intersect as many fibers as possible through at least approximately two points and by so doing strengthen the structure sufficiently so that all suitable types of shorter fibered papers can be employed for the purposes herein set forth.

As an example it is preferred that in so etching a cylinder the crisscross lines are preferably approximately $\frac{1}{2}$ inch wide and $\frac{1}{8}$ inch apart. This selection, of course, depends largely on the nature of the paper as determined by the length of its fibers. The depth of the etch should be approximately .0045 to .0050 inch for about a two-hour etch which has been found preferable in supplying the preferred lacquer formation. The infusion areas of such a dimensional etch each presents a four sided surface of about $\frac{3}{4}$ of an inch on a side through which infusion is permitted to occur.

Figure 2 of the drawing shows a portion of an infusion web illustrating this preferred type of lacquer application. The crisscross lines therein illustrated may be applied on one or both sides of the sheet but it is preferred to make the application on one side, preferably the inner surface forming a bag structure. As above stated a "size" coating made with an etched cylinder can be applied to both sides of the paper or on one side only. In each case such a size can be overprinted on one or both sides additionally with the crisscross lines illustrated in Fig. 2 depending on the strength desired as well as the nature of the use to which the paper is to be put for it should be understood that while the present invention specifically contemplates the use of such an infusion paper for tea ball purposes, such lacquered paper might also be utilized for other suitable types of filtration. In either case the lacquer application made with etched rotogravure

cylinders insures uniform thickness of a lacquer film throughout the web surface.

Such an infusion web lends itself readily to various types of tea ball filter bag construction. For example, in the illustrations shown in Figs. 3 and 4 the marginal areas of the bag may be heat-sealed thereby eliminating the need for stitching or stapling because of the thermoplastic lacquer application. In such case, of course, it is preferable to have the thermoplastic lacquer on the inner faces of the bag only, inasmuch as the amount of lacquer is sufficient to effect a suitable seal and there is little danger of lacquer accumulation on the sealing irons when lacquer is not present on the outside of the web. In the mechanical type of bag, such as that illustrated in Fig. 5, wherein staples, for example, are used the lacquer may be applied on either or both sides of the walls of the bag.

In addition to the foregoing advantages it will be appreciated that the present process has other advantages. For example, the lines of lacquer may take various forms and shapes illustrating different designs. The name of the packer or supplier of the commodity or their trade-marks or trade names can be imprinted continuously across the paper by means of the lacquer application instead of the particular lines as shown, it being only necessary that the infusion areas are not too large to cause disintegration of the fiber. When the bag is immersed in hot water these lacquer insignia are amplified and tend to stand out in sharp display relief. Another advantage is that the sealing irons can be provided with similar indicia when the heat-sealed type of bag is being formed and these marks will burn into or "brand" these indicia along the sealed marginal areas of the bag. A further advantage in this connection is that in connection with this branding operation the paper can be perforated in any suitable manner between the inner heat sealed margin and the outer edge holding a dip cord. For example, Fig. 3 further illustrates this type of bag. Perforations running across an extension defining, for example, the fourth marginal edge of such a bag would permit a dip tag connected to the other end of the cord to be utilized.

It will thus be seen that the objects hereinbefore set forth may be readily and efficiently attained and since certain changes in carrying out the above method, and certain modifications in the articles which embody the invention may be made without departing from its scope, 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.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

This application is a continuation of application Serial No. 444,454, now abandoned, filed May 25, 1942, in my name and the name of Edward M. Bernstein.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A tea bag, which comprises a sealed web of filter material adapted to hold a quantity of tea, said web being highly permeable and formed of closely interlaced cellulosic fibers and said fibers being bonded by lines of a non-toxic, substantial-

ly odorless and tasteless, hot water-repellent lacquer.

2. An article of manufacture containing an infusion commodity, which comprises a highly permeable enveloping filtering structure for said commodity of interlaced cellulosic fibers and a coating of a non-toxic, substantially odorless and tasteless, hot water-repellent lacquer bonding said fibers, said structure presenting infusion areas in said coating of lacquer.

3. An article of manufacture containing an infusion commodity, which comprises a highly permeable enveloping filtering structure for said commodity of cellulosic fibers and reinforcing lines of a non-toxic, substantially odorless and tasteless, hot water-repellent lacquer bonding said fibers, said lacquer being thermo-elastic when deposited in hot water.

4. An article of manufacture containing an infusion commodity, which comprises a highly permeable enveloping filtering structure for said commodity of cellulosic fibers and reinforcing lines of a non-toxic, substantially odorless and tasteless, hot water-repellent lacquer bonding said fibers, said structure having infusion areas between said lines of lacquer and said lines preventing disintegration of said fibers in said infusion areas when said structure is deposited in hot water.

5. A tea container or the like, which comprises a tea-holding structure of highly permeable, fibrous, cellulosic, filter material, said material having a coating of a non-toxic, substantially odorless and tasteless, hot water-repellent, thermoplastic lacquer on its inner surface and having infusion areas thereon, said structure having sealed areas to retain its contents, said sealed areas having been provided by activation of said thermoplastic lacquer.

6. A tea, coffee or similar bag comprising a container formed of two half sections of bag forming material of porous structure and enclosing a quantity of the commodity, each of said half sections being provided with spaced stripes of adhesive, the stripes of one half section being disposed to extend in a direction at an angle to the stripes of its opposing half section, said bag being sealed along at least some of its edges by the intersection of the stripes of adhesive on one half section with the stripes of adhesive on its opposing half section forming a continuous seal.

7. A tea, coffee or similar bag comprising a container formed of two half sections of bag forming material of porous structure and enclosing a quantity of the commodity, each of said half sections being provided with spaced stripes of thermoplastic adhesive, the stripes of one half section being disposed to extend at an angle to the stripes of its opposing half section, said bag being heat sealed along at least some of its edges by the intersection of the stripes of adhesive on one half section with the stripes of adhesive on its opposing half section forming a continuous seal.

8. A tea, coffee or similar bag comprising a container formed of two half sections of bag forming material of porous structure and enclosing a quantity of the commodity, each of said half sections being provided with spaced stripes of adhesive throughout the entire surface of the contacting faces, the stripes of one half section at an edge thereof being disposed at an angle to the stripes of the corresponding edge of its opposing half section, said bag having sealed edges formed by the intersection of the stripes of adhe-

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sive on one half section with the stripes of adhesive on its opposing half section forming a continuous seal.

9. A tea, coffee or similar bag comprising a container formed of two half sections of bag forming material of porous structure and enclosing a quantity of the commodity, each of said half sections being provided with spaced stripes of thermoplastic adhesive, the stripes of one half section forming a criss-cross pattern with the stripes of its opposing half section, said bag being heat sealed along its edges, said sealed edges extending over at least one line of squares formed by said criss-cross pattern forming a continuous seal.

10. In a method of making a tea, coffee or similar bag, the steps comprising providing two half sections of bag making material with spaced

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stripes of thermo-plastic adhesive, placing the bag sections together to present the adhesive stripes of one half section in intersecting relation to the adhesive stripes of its opposing half sections, introducing a quantity of the commodity between the sections, and heat sealing the edges of the assembled sections, the intersecting adhesive portions forming a continuous seal along said edges.

THOMAS RUSSELL BAXTER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,313,696	Yates	Mar. 9, 1943

Certificate of Correction

Patent No. 2,498,197

February 21, 1950

THOMAS RUSSELL BAXTER

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 50, for the word "supplying" read *applying*;

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 30th day of May, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.