METHOD AND APPARATUS FOR MAKING TEA BAGS OR THE LIKE

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Application November 7, 1952, Serial No. 319,281

4 Claims. (Cl. 53—29)

This invention relates to the manufacture of infusion bags, and more in particular to a new and improved tea bag or similar construction and method of manufacture of improved paper materials used therein.

Heretofore, in the tea bag making art, it is the practice, with bags of the type wherein the edges are heat and pressure sealed together, to use a paper having an adhesive component or layer that could be activated by heat and pressure to seal the paper to another piece of paper. In some cases this adhesive component is in the form of particles which are deposited in a thin non-contiguous layer over one entire surface of the paper strip during the manufacture thereof. This provides a thin non-contiguous layer of the adhesive on one entire surface of the finished paper. Another way of attaining a similar disposition of adhesive material over one entire surface of the paper is to apply the adhesive dispersed in a solvent in a manner similar to printing with subsequent evaporation of the solvent. This adhesive material is then used to provide sealing at the edges of the tea bags, but it may also increase the wet strength of the paper thus to give the walls of the tea bag sufficient wet strength when the tea bag is placed in hot water for brewing.

Tea bags of this type are subject to two outstanding defects, namely: the adhesive material on the walls of the bag being non-water permeable decreases, for a given paper, the rate of free circulation of water to and from the tea so substantially retarding the rate of infusion of the dissolved tea constituents, and the adhesive material may also adversely affect the taste of the brewed beverage, the hot water picking up slight undesirable taste characteristics from the adhesive, the quantity of "off taste" being roughly proportional to the quantity of adhesive to which the hot water is freely exposed.

According to the present invention these and other defects of the prior art are overcome or substantially eliminated by the provision of a heat-sealed type bag having no adhesive material throughout the major portion of the bag walls. The sealing adhesive material is confined to a limited area and is sandwiched between two layers of the sheet material from which the bag is formed.

It is an object of the present invention to provide a tea bag having an improved rate of infusion. It is another object to provide a tea bag of the heat-sealed type which does not impair the taste of the beverage. It is a further object of the present invention to provide a new and improved method of manufacturing tea bags of the improved type. It is a further object of the present invention to provide a tea bag of the heat-sealed type in which the adhesive material is not relied upon for the wet strength of the paper. It is a further object of the present invention to provide a paper adapted to be sealed to similar corresponding strips to form tea bags therebetween. It is a further object of the present invention to provide means for properly aligning paper having the strips of adhesive thereon to insure the proper formation of the tea bags. It is a still further object to provide an improved tea bag and an improved sheet material for the production thereof. In the illustrative embodiments of the present invention this sheet material is paper, although it should be pointed out that the advantages of certain aspects of the invention are attainable with sheet materials which are not paper. These and other and further objects will be in part apparent and in part pointed out as the specification proceeds.

In the drawings:

Figure 1 is a plan view of a strip of paper having thereon the strips of adhesive and aligning marks to form a series of single bags in accordance with the invention;

Figure 2 is a fragmentary view similar to Figure 1 showing another form of aligning mark;

Figure 3 is a perspective view of the completed tea bag of Figure 1;

Figure 4 is a partial sectional view of the tea bag taken on the line 4—4 of Figure 3;

Figure 5 is a perspective view on a reduced scale of an apparatus for depositing adhesive material on the paper web;

Figure 6 is a view similar to Figure 1 on a reduced scale but illustrating another embodiment of the invention;

Figure 7 is a somewhat schematic representation of a machine for automatically producing tea bags from the paper of Figure 6;

Figure 8 is a view similar to Figure 3 showing a tea bag manufactured in accordance with the arrangement of Figure 6;

Figures 9 and 10 are top plan views of another embodiment of the invention showing an alternative method of making tea bags.

Referring now to Figure 3 the tea bag 10 has a relatively strong C-shaped frame with a tag 9 having its string 11 attached to the top of the C in the frame area. The bag is made (see Figure 1) from a sheet of paper 12 having upon the top surface as shown, a series of spaced transverse stripes of adhesive 14 and longitudinal stripes of adhesive 16 and 18 at its two edges. The paper itself is of a suitable porous structure to permit rapid brewing of the tea, and yet the paper has sufficient wet strength to prevent rupture of the bag during brewing in hot water. The wet strength of the paper walls of the bag in the present invention is not obtained by the addition of an adhesive material, but rather the inherent qualities of the paper itself is generally relied on.

In some cases this strength is enhanced by the addition of a wet strength agent such as melamine.

The paper 12 has the "ladder" pattern of stripes of adhesive 14, 16, and 18 so that it may be folded along the longitudinal axis 17 and a dose of tea deposited between each transverse adhesive stripe 14 and the next. During the forming operation, mating adhesive stripes are heat-sealed together to form a compartment for each dose of tea, and the strip is severed into individual tea bags 10.

A centrally positioned index mark 20 is provided at each transverse stripe 14. These marks are used to insure proper register of the strip of paper with respect to the transverse sealing bar operation thus insuring that the heat and pressure are applied throughout the entire area of each of the transverse stripes. Illustrative these marks are rectangular areas which are colored differently from the base material so as to be sensed by a photo-electric cell. However, these marks may consist of areas suitably modified from the paper stock (i.e., visible or invisible markings, punched holes or notches) to permit automatic detection, for example, by electrical or mechanical means which sense such markings. These marks 20 are positioned centrally of strip 12 but under some circumstances they are at or near one of the edges.

For example, in Figure 2 the marks are in the form of...
triangular notches 19. During the tea bag forming operation the movement of the paper is controlled by a photo-electric cell controller which senses these marks and maintains the desired register as indicated above.

There is thus provided a tea bag in which the walls are free from adhesive material except for the limited peripheral areas of the actual seal along three sides; and there the adhesive material is enclosed in sandwich fashion between two layers of the paper 12. This permits much more rapid and dependable brewing of the tea within the bag, and the layers of paper cover the adhesive material so as to reduce materially any adverse effect upon the taste of the tea.

Because of the relatively strong rim or supporting edges which form a supporting frame to which the string is attached, the wet strength required of the paper along the sides of the body of tea during brewing is at a minimum, hence the natural wet strength of the paper is near to or may even meet this requirement and a minimum amount or even no wet strength material may be required.

In any event a lesser amount of the wet strength agent is required because of the supporting frame.

It should also be noted that with this new type of bag there is a substantial saving in heat sealing adhesive material. Furthermore, the adhesive material is applied with an edge of each that there will be sufficient amount at all mating edges to assure a satisfactory seal, yet there is no excess.

Referring now to Figures 6 and 7, there is shown another embodiment of the present invention. In this embodiment as shown in Figure 6 the strip 26 of bag forming paper is made one bag width wide and carries thereon narrow peripheral stripes 16a and 18a of adhesive material. In this embodiment to form the bags, instead of folding the strip of paper along its longitudinal axis, a second strip 28 of paper one bag width wide and carrying thereon a similar pair of narrow longitudinal edge stripes of adhesive material is fed to an operating zone 30 at right angles to said first strip. The first strip 26 is positioned within the operating zone below a tea dosing device 31 and a dose of tea 34 is deposited thereon. The second strip of paper 28 is then fed at right angles to said first strip to overlie the portion of strip 26 containing said dose of tea, and a heat-sealing frame is then brought against the superimposed strips of paper to seal said strips together along the adhesive stripes to form a sealed bag. The completed bag shown in Figure 6 can be severed from said frame either simultaneously with the sealing thereof or separately at a later stage in the operations.

There is thus provided a novel tea bag and a method of making the same which does not require any transverse stripes of adhesive material nor any index marks to register the paper and heat-sealing apparatus. The manufacturing process for both the paper and the tea bag is thus greatly simplified and a frame portion of increased strength is obtained for each bag.

Referring now to Figures 9 and 10, there is shown another embodiment of the present invention. In this embodiment, the strip of paper is made several bag widths wide with narrow longitudinal stripes of adhesive material spaced one bag width apart thereacross. In the illustrative form shown in Figures 9 and 10, the strips 26a and 28a are five bag widths wide and there are six parallel adhesive stripes 22 of double width on each strip.

To form the bags, the paper strip 26a is fed into the operating zone 36 until it abuts against the stop 32 which properly positions it therein. Five rows of doses of tea 34a of five doses in each row, are then deposited in a square or "checker" pattern upon strip 26a. The other paper strip 28a is then fed in at right angles to strip 26a until it abuts stops 33 and its end 36 coincides with the side edge 38 of strip 26a, and the edge 40 of strip 28a coincides with the end 42 of strip 26a. The overlapping portions of the strips 26a and 28a are a square and the adhesive stripes 22 form a pattern of square frames around the respective doses 34a. A grid then heat seals the longitudinal stripes 22 to form twenty-five compartments each containing a single dose of tea. The individual tea bags 44 are cut apart either at the time of the heat-sealing operation or later and appear substantially as shown in Figure 8 above. There is thus provided a novel method for producing individual tea bags.

Referring now to Figure 5, there is shown a method of and apparatus for depositing the adhesive strips 14, 16 and 18 on the paper sheets 12. Illustratively, this is shown as a printing operation wherein a roll 46 of paper of suitable structure is fed between a pair of printing rollers 48 and 50 which impart the ladderlike structure and the index mark to the paper which is then rewound upon a roll 52. In the illustrative embodiment shown, the upper roll 48 carries thereon a printing grid having peripheral stripes 54 and 56 and transverse stripes 58 which feed a solvent carrying the adhesive to the paper where the solvent is subsequently evaporated leaving the ladderlike structure of adhesive on the upper surface of the paper. The lower roller 50 is adapted to print on the underside of the paper the index mark 20 adjacent an edge section.

In making the paper strips of Figure 6, the transverse stripes 58 are omitted and in making the paper of Figures 9 and 10 additional longitudinal stripes such as 48 and 56 would be spaced therebetween to provide the desired longitudinal stripes 22.

While there are given above certain specific examples of this invention and its application in practical use and also certain modifications and alternatives, it should be understood that these are not intended to be exhaustive or to be limiting of the invention. On the contrary, these illustrations and the explanations herein are given in order to acquaint others skilled in the art with this invention and the principles thereof and a suitable manner of its application in practical use, so that others skilled in the art may be enabled to modify the invention and to adapt and apply it in numerous forms, each as may be best suited to the requirements of a particular use.

What is claimed is:

1. The method of making a tea bag or the like comprising, forming a first elongated web of bag forming material with a plurality of spaced stripes of thermoplastic adhesive extending lengthwise only of said web, advancing said second web over said first at about a right angle thereto so said stripes of adhesive intersect at right angles, introducing a plurality of doses of the tea or the like between the stripes on said webs and heat sealing said webs together along said adhesive stripes to form a plurality of compartments, and severing said compartments into individual bags.

2. The method of making tea bags or the like comprising, forming two elongated webs of substantially endless bag forming material having a plurality of spaced adhesive stripes extending longitudinally only of said webs on one surface thereof, feeding one of said webs to an operating zone with its said adhesive stripes on the upper surface thereof, depositing a plurality of spaced doses of the tea or the like between said stripes, feeding said second web of bag material to said zone at substantially a right angle to said one web with the adhesive stripes on the bottom surface thereof and oriented at right angles to said first stripes of adhesive and sealing said webs together within the overlapping portions thereof along said adhesive stripes of adhesive.

3. Apparatus for making and filling tea bags and the like, comprising in combination, means for feeding an
5 elongated web of bag forming material of porous structure to an operating zone, said web having bands of adhesive extending lengthwise only thereof, means for depositing between the bands of adhesive thereon a plurality of spaced doses of tea and the like, feeding means for presenting a second web of bag forming material of porous structure and having bands of adhesive extending lengthwise only thereof to said operating zone perpendicularly to said first web and so as to overlap said first web and the doses of tea or the like thereon, said second web having its bands of adhesive extending substantially perpendicularly to the bands on said first web, sealing means for sealing said webs together at said bands and around said spaced doses of tea and the like to form a plurality of sealed compartments, and severing means for separating said compartments from said webs and from each other.

4. Apparatus for simultaneously forming a plurality of tea bags and the like comprising in combination, feeding means for guiding an elongated strip of paper having bands of adhesive thereon extending longitudinally only of said strip to an operating zone, a dosing device for depositing a plurality of doses of tea and the like at spaced intervals upon a portion of said strip of bag forming material between said bands in said operating zone, means for feeding a second elongated strip of bag forming material having bands of adhesive extending longitudinally only thereof to said operating zone perpendicularly to said first strip so as to overlap said first strip in said operating zone and dispose the bands on said strips substantially perpendicular to each other, and heat sealing grid means to seal said strips together about said spaced doses of tea or the like to simultaneously form a plurality of bags.

References Cited in the file of this patent

UNITED STATES PATENTS

1,686,818 Kirschbraun Oct. 9, 1928
1,847,269 Schur Mar. 1, 1932
2,151,570 Shoults et al. Mar. 21, 1939
2,213,602 Yates Sept. 3, 1940
2,313,696 Yates Mar. 9, 1943
2,390,071 Barnett Dec. 4, 1945
2,494,484 Nicolle Jan. 10, 1950
2,695,483 Toews Nov. 30, 1954