

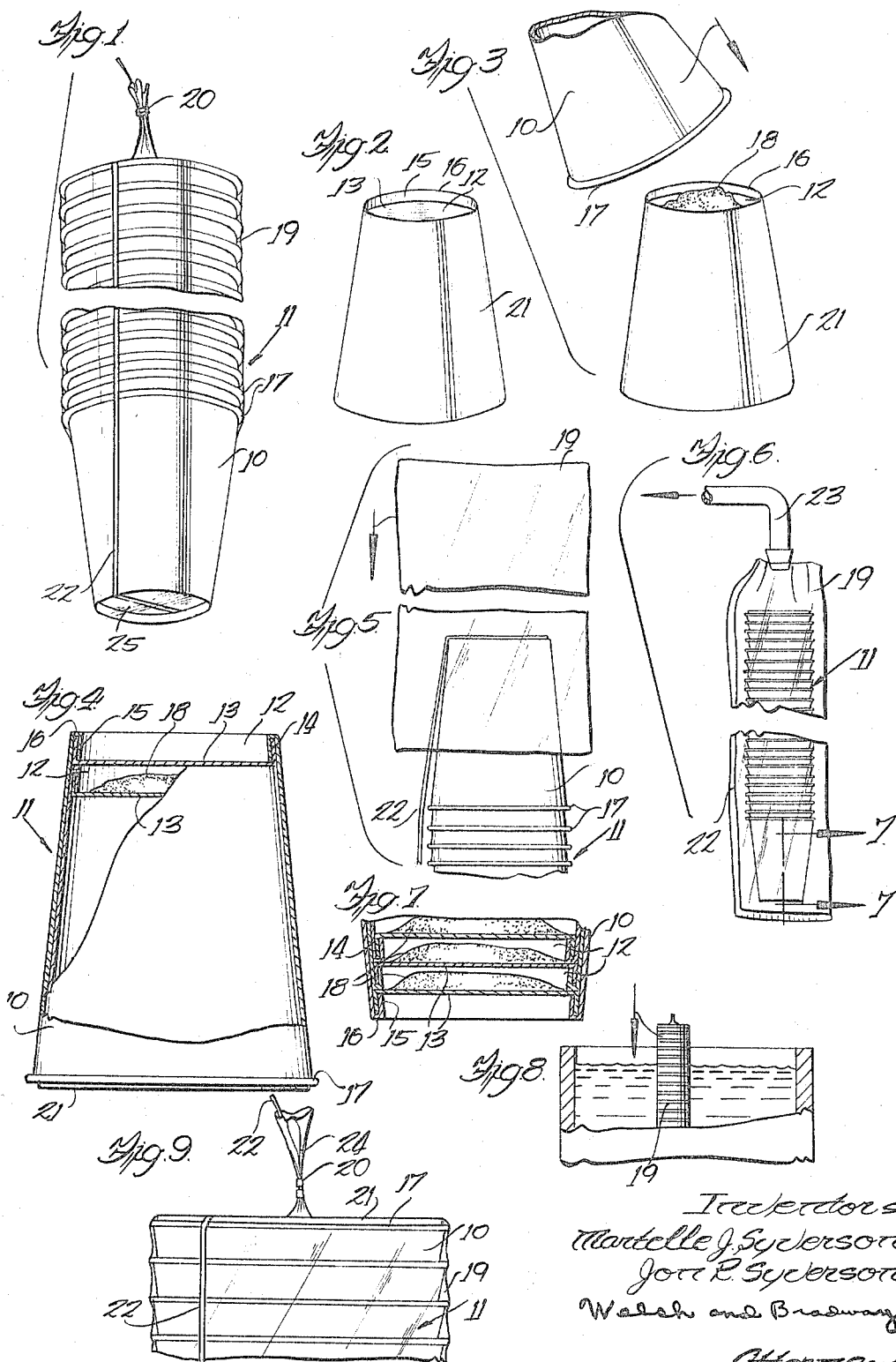
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METHOD OF PACKAGING

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METHOD OF PACKAGING

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This invention relates generally to the packaging of products for dispensing machines and, more particularly, to the packaging of hygroscopic or deliquescent materials in granular or powder form intended for use in machines for dispensing liquids in cups. Such materials are dissolved or suspended in water to form the liquid being dispensed and, in storage prior to the addition of liquid, tend to attract and absorb moisture so as to become liquid or form a sticky cake.

The primary object of the present invention is to package material of the above character in a novel manner utilizing a stack of standard nested dispensing cups while simplifying the dispensing operation and protecting the material from exposure to moisture prior to the time it is dispensed.

Another object is to protect the material from exposure to moisture by storing a sufficient quantity of material for each cup in a sealed enclosure formed by part of that cup and the adjacent cup in the stack.

A further object is to utilize the recessed bottoms of the cups as storage places for the quantities of material and to bring the bottom outside edge of each cup around the recess against the bottom inside wall of the next adjacent cup to seal the enclosure for the material in the recess.

Still another object is to maintain the seal between adjacent cups in a novel manner prior to dispensing by exerting a continuous endwise pressure on the cups.

A more detailed object is to enclose the stack of cups in a moisture proof material which shrinks so that it also exerts the endwise pressure to maintain the seals.

The invention also resides in the novel manner of delivering the quantities of material to the cups and sealing the enclosures so that a finished stack of cups, including the material to be dispersed, is of substantially the same length as a stack of the same number of cups without the material.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings in which:

FIGURE 1 is a fragmentary perspective view of a finished package embodying the novel features of the present invention.

FIG. 2 is a perspective view showing position of a cup in the first step of the novel method of forming the package.

FIG. 3 is a fragmentary perspective view showing the step of telescoping adjacent cups in the package.

FIG. 4 is an enlarged side elevational view of a partially completed package, some parts being broken away and shown in section.

FIG. 5 is a fragmentary reduced side elevational view showing a further step in the method.

FIG. 6 is a further reduced side elevational view of a subsequent method step.

FIG. 7 is an enlarged fragmentary sectional taken along the line 7-7.

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FIG. 8 is a fragmentary reduced side elevational view showing the final step in the formation of the package.

FIG. 9 is an enlarged fragmentary side elevational view of the finished package.

The present invention is especially adapted for packaging hygroscopic or deliquescent materials which are to be used in beverage dispensing machines. These materials, for example, dehydrated soups, and beverages such as coffee, tea and chocolate, are powdery or granular and are characterized by an attraction for moisture whereby, when exposed to the atmosphere or water vapor, they absorb the moisture to form a liquid or sticky mass. In beverage dispensing machines, the beverage usually is formed by adding hot or cold water to a measured quantity of the material already deposited in a container.

Standard containers for the beverage machines are cups which are shaped as frustums of cones and normally are nested one within the other to form a stack. The cups may be formed of paper, a plastic material, or a plastic coated paper and each has a bottom wall spaced from the bottom edge to form a downwardly opening recess. This recess is formed by the bottom of the cup which is a disk having a downturned flange received between the lower end portion of the conical side wall of the cup and an inturned flange connected to the bottom of the conical wall along the downwardly facing bottom edge of the cup. These parts all are secured together to form a water tight joint. At its upper edge portion, the conical wall is curled outwardly to form a pouring lip.

In accordance with the present invention, the beverage material and the standard cups are packaged together in a novel manner to simplify the dispensing and also to avoid deterioration of the material due to moisture during storage and before water is added to form the beverage. To these ends, a measured quantity of the material suitable for one serving of beverage is placed on the bottom wall of each cup and this wall and the bottom edge of the cup nesting within the first cup are maintained in sealing engagement with each other around the material so that the material is retained within the recess of the nesting cup and is free of exposure to moisture until the cups are separated. In the machine, the stack is supported vertically with the cups opening downwardly and the cups are released one at a time to gravitate from the bottom of the stack, thereby separating the bottom cup from the nesting cup above it, the lips cooperating with parts of the machine (not shown) to effect the individual release of the cups. When the bottom cup is released, the quantity of beverage material already in the cup gravitates with it and only the liquid need be added to complete the beverage.

Prevention of moisture contact with the beverage material in the stack is further achieved by enclosing the stack in a sealed bag of moisture-proof material which is subjected to a vacuum at the time of sealing. In accordance with a more detailed aspect of the invention, this bag also is utilized to maintain the seal between the inside of the bottom wall of each cup and the bottom edge of the next higher nesting cup by exerting an endwise pressure on the entire stack, the bottom wall of the lower cup providing a sealing surface extending around the periphery of the bottom edge portion of the next higher cup. For the purpose of providing the

endwise pressure, the bag is made of a plastic material of the type which shrinks when subjected to heat and retains its shrunken condition when the heat is removed. A material found suitable for this purpose is a transparent plastic film sold under the trade-name of "Cryovac" by the Cryovac Division of W. R. Grace & Co. of Cedar Rapids, Iowa. In the present instance, the bag is a hollow tube of the material closed at one end and having its other end open to receive the stack but sealed by twisting the material and holding it with a clamping device such as a small rubber band 20, or small metal clip (not shown), after the stack is inserted. Such a device is applied before the material is shrunk so that it becomes and remains interlocked with the material during and after shrinking.

To provide a sealed enclosure for the beverage material 18 in the top cup 10 in the stack 11, a dummy cup 21 is provided. This cup is similar to the standard vending cups, but it has no lip 17 to coact with the mechanism in the machine for holding the stack and releasing the bottom cup one at a time. The upper edge of conical side wall of the cup does, however, project above the lip of the top standard cup as shown in FIG. 9 so as to be engaged and urged axially and inwardly by the shrunken bag material 19 to maintain the seal between its bottom edge 16 and the inside of the bottom wall 13 of the top vending cup. Having no lip, the dummy cup gravitates with the top standard cup when the latter is released in the machine.

The bag material 19 being relatively tough, it is preferred to facilitate opening by the provisions of a tear string 22. This string, which may be formed of any suitable material, extends axially along the outer sides of the cups 10 for the full length of the stack 11 and outwardly through the sealed open end of the bag. When it is desired to remove the bag and place the stack in the dispensing machine, the rubber band 20 is removed so as to release the string which then may be pulled easily to tear the bag throughout its length so that it simply falls away from the stack. The pressure of the bag material shrinking against the conical side walls and the lips of the cup holds the string against endwise slippage and avoids the necessity of adhesive, or other means, for fastening the string to the stack or the bag. If desired, a positive interlock between the string and stack may be provided by attaching to either or both ends of the string an enlarged object such as a circular false cup bottom 25 fitting into the bottom recess 12 of the lowermost cup of the stack (FIG. 1) and retained there by the bag.

One of the more important features of the present invention is the novel manner of placing each measured quantity 18 of beverage material within its sealed enclosure 12 while insuring contact of the bottom edge 16 of the nesting cup 10 with the adjacent bottom wall 13 of the next cup at all points around their peripheries. This is accomplished in spite of the powdery nature of the material and its tendency to scatter with moving air current such as occur when one cup is telescoped with the next to form the stack. Also, the bottom edge of each cup being in contact with the bottom wall of the next adjacent cup as made possible by the novel method of placing the material, the stack of cups plus the material is of the same length as a stack of the same number of standard cups without the material.

In the novel method of forming the improved package, the first step is to support the dummy cup 21 in inverted position with its bottom recess 12 opening upwardly as shown in FIG. 2. While the cup is maintained in this position, the measured quantity 18 is deposited in the recess. Next, a second or standard cup 10, in a similarly inverted position as shown in FIG. 3, is telescoped over the dummy cup until the sealing surface provided by its bottom wall, then facing downwardly, is brought into contact with the bottom edge 16 of the dummy cup which

then faces upwardly. During this movement, the air of the outer or upper cup is displaced, but since the material is in the recess 12 and the air there is not displaced, the material is not disturbed. The volume of the material in the recess is no greater than the volume of the recess as shown in FIG. 4. Due to this and the lack of disturbance of the powder by air movements, the bottom wall of the second cup engages the bottom edge of the first cup completely around their peripheries so as to form an effective seal against the passage of the material, air or moisture.

After the second cup 10 has become nested on the first cup 21, and while the two are retained in inverted positions, the measured quantity of material 18 is deposited in the upwardly opening recess 12 of the second cup and a third cup 10 is telescoped over the second cup in the manner described above, the material being undisturbed and the bottom wall 13 of the third cup coming into engagement with the bottom edge 16 of the second cup completely around their peripheries. The steps of filling the recess of the uppermost cup and telescoping an additional cup onto the stack is repeated until the desired number of cups is reached. It has been found convenient to form a stack of 75 cups, this being the number sold and packaged in a single container by one manufacturer of standard cups currently available. A plastic lined paper cup packaged in this manner and found suitable for practicing the invention is sold under the trade-name "China-Cote" by Lily-Tulip Cup Corporation of New York, New York. Of course, no material is deposited in the recess of the top cup in the stack of inverted cups which will become the bottom cup in the dispensing machine.

When the stack 11 of inverted cups 10 has been completed by filling the recesses 12 and telescoping the cups one by one onto the stack, the tear string 22 is extended first across the top of the stack as shown in FIG. 5 and then downwardly along the side of the stack so as to extend beyond the bottom. Then, the bag or tube 19 of enclosing material, larger than the stack and inverted so that its bottom is open, is telescoped downwardly over the stack as indicated by the arrow in FIG. 5. Upon completion of this step and while the stack is compressed axially by a pressure applied endwise and inwardly on the ends of the stack so as to maintain the sealing engagement between the bottom wall 13 of each cup and the bottom edge 16 of the nesting cup, the entire stack with the tube around it and the tear string are inverted into the position shown in FIG. 6. During this inversion, the quantity of material in the recess of the dummy cup 21 and all other cups except the uppermost cup in the inverted stack, is transferred onto the bottom wall 13 of the next adjacent cup where it will remain to be dispensed with the latter cup in the dispensing machine. Such position of the material after the inversion is illustrated in FIG. 7.

Prior to sealing the open end of the bag 19, the interior of the bag with the stack 11 in its upright or dispensing position is subjected to a vacuum for the withdrawal of as much air as conveniently possible from the bag. This step is illustrated in FIG. 6 in which a suitable pipe 23 connected to a source of vacuum (not shown) is inserted in the open upper end of the bag. As the pipe is withdrawn, the open end portion of the tube is twisted as indicated at 24 to form a seal preventing air from passing into or out of the bag. It is noted that the tear strip also is twisted with the open end of the tube and continues to project outwardly beyond such end (FIG. 9). The twisted portions are held in sealing engagement with each other by the rubber band 20, this clamping member being applied immediately after the twisting.

As a final step, the sealed bag 19 is subjected to heat by which it is shrunk, not only radially and inwardly into engagement with the lips 17 of the cups 10, but also

axially and inwardly against the ends of the stack 11 so as to maintain a continuous endwise pressure between cups and thereby preserve the sealing engagement between the bottom wall 13 of each cup and the bottom edge 16 of the next adjacent cup. This heat is applied conveniently by immersing the sealed bag in a heated liquid, such as water, as depicted in FIG. 8. It will be seen that each measured quantity 18 of the beverage material is protected, not only by the sealing engagement of the bottom wall and bottom edge of the cups defining its enclosure, but also by the engagement of the surrounding bag with the lips of the successive cups as shown in FIG. 9 to provide a plurality of seals spaced along the length of the finished bag and preventing movement of air and moisture within the bag.

Once the bag 19 has been sealed and shrunk around the stack 11 so as to maintain a constant endwise and radial pressure on the stack, the stack may be moved to many different positions and each quantity 18 of beverage material will remain dry in its sealed compartment. At the time the stack is to be inserted in upright position in a dispensing machine, the rubber band 20 is removed and the tear string 22 is pulled to open the bag throughout its length so that it may be conveniently stripped from the stack. At this time, each quantity of material is resting on the bottom of the cup with which that quantity will be dispensed. Until the cup is dropped from the stack, its bottom wall 13 remains in engagement with the bottom edge 16 of the next nesting cup to maintain the seal and prevent the entry of moisture into contact with the material. Each quantity of material thus remains protected until the precise moment when it is dispensed.

While the invention is susceptible of various modifications and alternative construction and steps, we have shown in the drawings and have described in detail the preferred embodiment. It is understood that we do not intend to limit the invention by such disclosure, but aim to cover all modifications and alternative constructions and uses falling within the spirit and scope of the invention as expressed in the appended claims.

We claim:

1. In a method of packaging a material to be mixed with a liquid, the steps of supporting a first recessed bottom cup in an inverted position with the recess opening upwardly, depositing in said upwardly opening recess a quantity of said material, telescoping said first cup and a second cup in inverted position together to bring a bottom exterior portion of the first cup into engagement with an interior bottom portion of the second cup to form a seal to prevent the escape of said material from said recess, applying an endwise pressure to said cups to maintain the cups in sealing engagement and, while maintaining said endwise pressure on said cups, enclosing the cups in a container which continues to apply the endwise pressure on the cups to maintain the sealing engagement of the cups.

2. In a method of packaging a dehydrated substance, the steps of supporting in an inverted position a first cup having a recessed bottom wall, thereby locating the recess in an upwardly opening position, depositing in said upwardly opening recess of said first cup a quantity of said substance having a volume no greater than that of the recess, telescoping said first cup and a second cup in inverted position together to bring the upwardly disposed bottom edge of the first cup into engagement with the downwardly facing bottom wall of the second cup to form a seal to prevent the escape of said quantity of said substance from said recess, applying an endwise pressure to said cups to maintain said bottom edge of said first cup in engagement with said bottom wall of said second cup, telescoping said cups within an open ended tube of plastic material subject to shrinkage upon the application of heat, closing the open end of said tube and sealing the tube around the cups, and applying heat to said tube to shrink the same radially against the sides of said cups and axially

inwardly to apply an endwise pressure to the cups to maintain said sealing engagement between said bottom edge of said first cup and said bottom wall of said second cup.

3. In a method of packaging a material to be added to water, the steps of supporting a first recessed bottom cup in an inverted position with the recess opening upwardly, depositing in said upwardly opening recess a quantity of said material, telescoping said first cup and a second cup in inverted position together to bring a bottom exterior portion of the first cup into engagement with an interior bottom portion of the second cup to form a seal to prevent the escape of said material from said recess, enclosing said cups in an outer covering of moisture impervious sheet material subject to shrinkage upon the application of heat, applying an endwise pressure to said cups to maintain the cups in sealing engagement, and while maintaining said endwise pressure on said cups, applying heat to said sheet material to shrink the same to continue the endwise pressure on the cups and the sealing engagement of the cups.

4. In a method of packaging a dehydrated substance, the steps of supporting a first recessed bottom cup in an inverted position with the recess opening upwardly, depositing in said upwardly opening recess of said first cup a quantity of said substance having a volume no greater than that of the recess, telescoping said first cup and a second cup in inverted position together to bring the upwardly disposed bottom edge of the first cup into engagement with the downwardly facing bottom wall of the second cup to form a seal to prevent the escape of said quantity of said substance from said recess, telescoping said inverted cups within a vertically disposed tube of plastic material subject to shrinkage upon the application of heat, applying an endwise pressure to said cups to maintain said bottom edge of said first cup in engagement with said bottom wall of said second cup while inverting the cups and said tube to bring the cups into a normal upright position and transfer said quantity of said substance from said recess of said first cup and onto the then upwardly facing wall of said second cup, applying a vacuum to an open end of said tube opposite said closed end, closing said open end, and applying heat to said tube to shrink the same radially against the sides of said cups and axially inwardly to apply an endwise pressure to the cups to maintain said sealing engagement between said bottom edge of said first cup and said bottom wall of said second cup.

5. In a method of packaging a dehydrated substance, the steps of supporting a first recessed bottom cup in an inverted position with the recess opening upwardly, depositing in said upwardly opening recess of said first cup a quantity of said substance having a volume no greater than that of the recess, telescoping said first cup and a second cup in inverted position together to bring the upwardly disposed bottom edge of the first cup into engagement with the downwardly facing bottom wall of the second cup to form a seal to prevent the escape of said quantity of said substance from said recess, applying an endwise pressure to said cups to maintain said bottom edge of said first cup in engagement with said bottom wall of said second cup while inverting said cups to bring said cups into a normal upright position and transfer said quantity of said substance from said recess of said first cup and onto the then upwardly facing wall of said second cup, telescoping said cups within an open ended tube of plastic material subject to shrinkage upon the application of heat, closing the open end of said tube and sealing the tube around the cups, and applying heat to said tube to shrink the same radially against the sides of said cups and axially inwardly to apply an endwise pressure to the cups to maintain said sealing engagement between said bottom edge of said first cup and said bottom wall of said second cup.

References Cited by the Examiner

UNITED STATES PATENTS

1,366,839	1/1921	Schanackenberg	-----	206—47
1,398,030	11/1921	Luellen	-----	206—65
2,532,871	12/1950	Wagner	-----	53—27 5
2,554,841	5/1951	Ramsey.		
2,649,197	8/1953	Jameson	-----	206—47
2,672,981	3/1954	Colgren	-----	206—65
2,804,236	8/1957	Piazz.		

2,886,928	5/1959	Pearce et al.	-----	53—22 X
2,915,176	12/1959	O'Neil	-----	206—47
2,967,383	1/1961	Rumsey	-----	53—22 X
2,971,304	2/1961	O'Neil	-----	206—47 X
3,043,067	7/1962	Rynkiewicz	-----	53—27
3,093,448	6/1963	Kirkpatrick et al.	-----	264—272

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