March 8, 1966 C. F. MONTUORI 3,238,692

METHOD AND APPARATUS FOR MAKING PACKAGES

Filed May 9, 1963 2 Sheets-Sheet 1

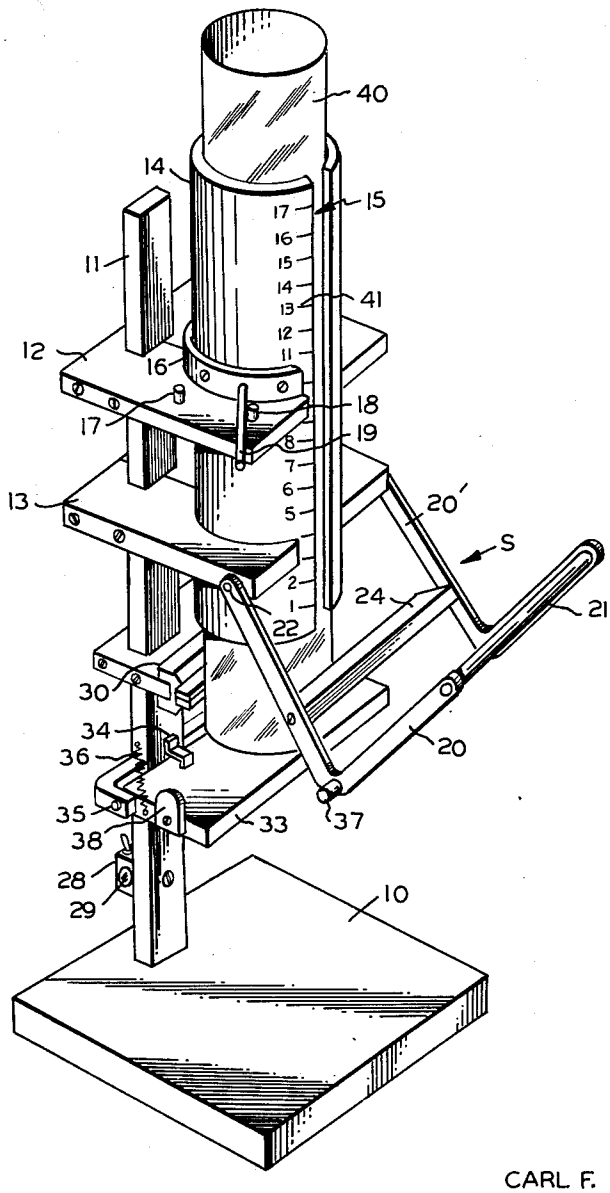


FIG. 1

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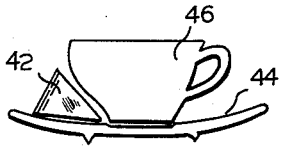


FIG.6

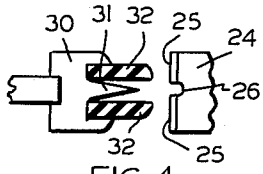


FIG.4

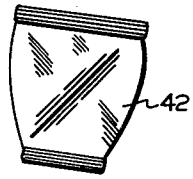


FIG.5

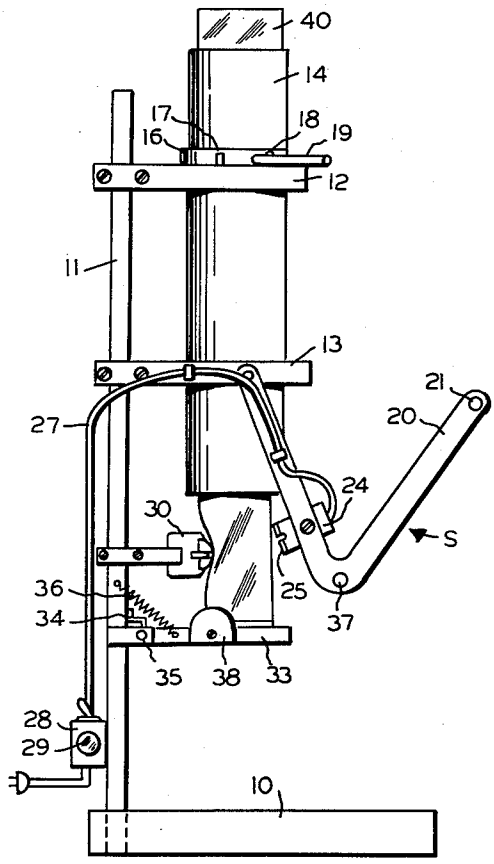


FIG.2

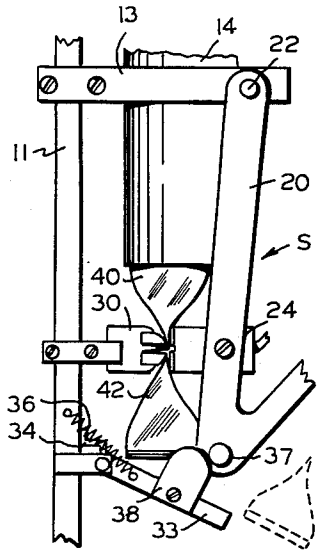


FIG.3

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METHOD AND APPARATUS FOR MAKING PACKAGES

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13 Claims. (Cl. 53—28)

My invention relates to a method and apparatus for making filled tetrahedral packages from tubular thermoplastic stock. In a preferred form, my invention is directed to an apparatus for use in a restaurant or similar eating establishment for the packaging of individual serving units of cream in an efficient, sanitary manner and at the lowest possible cost. In present practice of serving coffee cream in restaurants, individual reusable glass or china containers or "creamers" are commonly used, which require regular re-washing and re-sterilizing after each use. The small mouth diameter of these containers makes both filling and cleaning thereof difficult, and even after washing and sterilizing the same, these containers often exhibit foreign matter adhering to their internal surfaces. Further, during washing or other handling, these containers often become chipped and broken and therefore unattractive, requiring frequent replacement by the restaurant proprietor.

Additionally, many local health laws require that cream or other liquid foods which are served to the customer in open-topped or like individual serving units must be disposed of upon removal from the table, thereby incurring needless waste when served to non-cream users.

In present techniques of producing tetrahedral packages from thermoplastic stock, methods of sealing the opposite package ends involve the use of a plurality of heat sealing units, and associated complex feeding mechanisms. While this is highly practical for high speed factory packaging of liquids which are readily preserved and do not spoil, such as shampoo, etc. which are sold in prepackaged lots, the small business proprietor neither needs nor can afford such elaborate equipment in connection with local or retail outlet cream service as in restaurants.

It is therefore a principal object of this invention to provide a method and apparatus for making filled and sealed, individual service cream packages, which effectively overcome the disadvantages of the present methods and packages as above set forth.

A further important object of the present invention is to provide an efficient and simplified machine for producing tetrahedral packages from thermoplastic tubular material, which can readily be operated without special skills or training.

A further object of the invention is to produce sealed tetrahedral packages from tubular bag-like plastic material by use of a single manually operated single heat seal bar and back-up anvil wherein an elongated cream-filled plastic bag is rotated 90° about its longitudinal axis by an operator, such as a waitress, to create the individual transverse package and seals, thereby producing a tetrahedral package at the lowest possible cost.

A further object of the apparatus is to utilize the force of gravity to feed the cream-filled bag to the sealing and severing station after each succeeding package is formed.

Other objects and advantages of my packaging apparatus and method of use thereof will be apparent from the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of a preferred form of my apparatus with a plastic bag received therein;

FIG. 2 is a side elevation of the apparatus;

FIG. 3 is an enlarged fragmentary side elevation illustrating the heat sealing members in sealing position, and the operation of the completed package ejection device;

FIG. 4 is an enlarged fragmentary side view of the heat sealing members;

FIG. 5 is a perspective view of the completed cream package;

FIG. 6 is a diagrammatic view of the intended use of the package as served with coffee or tea.

In more detail and referring to the drawings in which a preferred form of my invention is shown, the apparatus includes a base **10** placed upon or secured to a table, having an upstanding standard **11** to which are secured the several working elements of my heat sealing and packaging apparatus.

Vertically spaced clamps **12** and **13** are adjustably secured to standard **11**, extending horizontally therefrom and over the base member **10** in spaced relation thereto. Clamps **12** and **13** are arcuately notched to loosely receive a split tube **14** of rigid material, such as aluminum. The tube **14** is provided with a longitudinally extending slot **15** for purposes hereinafter explained. A collar **16** is secured to tube **14** above clamp **12**, as by screws, and rests freely upon clamp **12** to support tube **14** in rotatable depending relation through the aligned notched clamps **12, 13**. Projecting laterally from collar **16** above clamp **12** is an arm **19**, while spaced abutment pins **17** and **18** extend upwardly from the upper surface of clamp **12**. Pins **17** and **18** are sufficiently spaced so that when the arm **19** is moved from the rearward abutment pin **17** to the forward abutment pin **18** or vice versa, split tube **14** to which collar **16** is secured is rotated about its longitudinal axis through substantially 90°.

The lower clamp **13** serves to mount a pivoted heat sealing assembly at S. A pair of parallel V-shaped arms **20, 20'** of the assembly S are pivotally connected to the forward end of clamp **13** as by pins **22**. Means such as torsion springs, not shown, are positioned about pins **22** between the arms **20, 20'** and the clamp **13** to bias the heat seal asembly S to a normally open position, as seen in FIGS. 1 and 2. The outer extremities of arms **20** and **20'** are connected by a handle **21**. Connected between the inner portions of arms **20** and **20'** is a heat sealing element **24**, having parallel, spaced gripping and sealing faces **25**, sheeted with "Teflon" or the like, between which is a knife receiving groove **26**, FIG. 4. The bar **24** has received therewithin in conventional manner an electrical heating element and thermostat, power for which is supplied through electric cord **27** running from bar **24** along arm **20**, thence adjacent clamp **13** and down standard **11**, as seen in FIG. 2. A suitable switch **28** is provided at the base of standard **11**, as well as an indicator light **29**.

Opposing the movable sealing bar **24** and rigidly secured to standard **11** by a suitable vertically adjustable clamp is a backup anvil **30**. The anvil is provided with a centrally disposed transverse knife blade **31** for cooperation with groove **26**, and resilient facing **32** of silicone rubber or the like is located on either side of knife **31** and extends forwardly thereof to effectively sheathe the same.

Spaced below anvil **30** and also attached by suitable clamp means to standard **11** is a bag support table **33** pivotally connected to its mounting means at **35**. Table **33** is normally held in horizontal position by light tension springs **36** connected between standard **11** and table **33**, upward pivotal movement of the table past a horizontal position being restrained by a suitable stop **34**. A cam plate **38** is secured in upwardly projecting relation to one side of table **33** for cooperation with a laterally extending pin **37** carried by the arm **20** of seal assembly S.

As illustrated in FIG. **1**, a tubular length of thermoplastic heat sealable material **40**, such as polyethylene, having substantially the same diameter as the inside di-

ameter of the tube 14 is received within the latter. This tubing 40 may have been previously provided with a transverse bottom heat seal, or one may be formed thereon by assembly S, whereby material 40 constitutes an elongated, open-ended bag. Plastic bag 40 is then filled with the desired amount of cream, preferably to a level near the upper end of tube 14. Calibrations 41 are provided adjacent longitudinal opening 15 of the tube to indicate to the operator the approximate number of packages which remain to be made from the charged plastic tube as succeeding packages are formed and severed therefrom.

The filled elongated bag 40 settles by gravity to rest upon table 33, but the weight thereof is insufficient to overcome the force of table-elevating springs 36. In this connection, it is noted that the lower portion of bag 40 between table 33 and the lower end of tube 14 is of insufficient length to cause the tube to buckle at this laterally unsupported area under the hydrostatic head of the cream. Further, the table 33 as well as clamps 12, 13 and anvil 30 are vertically adjustable with respect to each other along standard 11 to determine the vertical clearance between tube 14, table 33 and the anvil 30, thereby to predetermine the length of the ultimate package, as well as to insure ease of feed, etc.

In forming cream packages with my invention, an operator, such as a waitress, initially positions arm 19 against pin 18 as illustrated in FIG. 1, and insures that the bag bottom seal at table 33 is at right angles to the anvil 30 thereabove. Switch 28 is actuated to energize the heat sealing bar 24, and illuminate pilot light 29.

With filled bag 40 resting upon table 33, handle 21 is depressed to pivot the heat sealing element 24 into engagement with the plastic bag and against the backup anvil 30, thereby simultaneously transversely sealing a newly formed package 42 at its upper edge and forming a new bottom seal on bag 40, and then severing the completed package 42 from bag 40 along a transverse line between the seals. More particularly, as the sealing bar 24 approaches the anvil 30, bag 40 is flattened along closely spaced parallel transverse areas between the opposed "Teflon" and rubber facings 25, 32 respectively.

Such flattening of the bag drives the cream or other liquid therewithin upwardly in the bag and away from the seal area, and the bag is gripped snugly between the bar and anvil, effecting the spaced transverse heat seals. The liquid in the bag serves to rapidly chill the seals, especially as the bar 24 and anvil 30 are subsequently separated. Simultaneously with the approach and bag-flattening action of bar 24, pin 37 of arm 20 engages cam plate 38 of table 33 to cam the table 33 to inclined position, FIG. 3, against the force of springs 36. With the bag thus gripped by the bar and anvil, however, it cannot further descend by gravity from tube 14, nor at this point can the incomplete package 42 fall from the apparatus.

Further bar pressure exerted upon handle 21 compresses the rubber facing 32 of the anvil, permitting blade 31 to engage and transversely sever the plastic material, the blade entering groove 26 of the seal bar, thereby separating the complete creamer package 42 from the bag 40. Thereupon, slight separating movement of bar 24 from anvil 30 releases its grip upon package 42, while table 33 remains tilted, thereby permitting package 42 to fall by gravity from the seal area and discharge from the tilted table 33, as indicated in dashed lines in FIG. 3.

When the seal assembly S has returned outwardly to the FIG. 2 position, the filled bag 40 will descend by gravity to bring the newly formed lower transverse seal thereof to rest upon the now horizontal table 33. In this connection, it will be noted that anvil 30 projects slightly into the longitudinal path of bag 40 (FIG. 2) to thereby retard the fall thereof and prevent damage to the bag or spillage of its contents, while not fully obstructing the descent thereof.

Further, bag descent does not occur until compression has been fully relieved from anvil rubber facings 32, thereby permitting the same to expand outwardly to the FIG. 4 position to shield the bag from knife edge 31.

When the apparatus is fully restored to the FIG. 2 position, the operator will then arcuately shift arm 19 from pin 18 to pin 17 to thereby rotate tube 14 and the plastic bag 40 therewithin 90° about their longitudinal axes. Laterally directed forces of the hydrostatic head within bag 40 normally insures that the bag will rotate with the tube 14 through the short 90° arc. Further, the bag 40 by virtue of the cream therewithin will be slightly bulged into the longitudinal gap 15 of tube 14, thereby effectively rotatively keying the bag to the tube to a limited extent, which in nowise adversely affects the gravitational descent of the bag 40 realtive to the tube 14 after a package forming operation. If desired, further rotative keying may be provided in the form of one or more inwardly extending longitudinal flutes indented from the tube material or otherwise formed therein.

Once again the handle 21 is depressed to move the sealing assembly into engagement with the charged plastic tube, backup anvil, and knife element to form the top transverse heat seal of a succeeding package to thereby form a tetrahedral package having top and bottom seals perpendicular to each other.

The resultant tetrahedral creamer package 42, FIG. 5, is thus completely sealed and sanitary. The tetrahedral configuration of the package lends itself to coffee service in restaurants as indicated in FIG. 6, wherein the package 42 neatly lies on a flat side thereof upon a saucer 44 with a flattened triangular apex thereof extending toward the center of the saucer 44 into the generally acutely angled gap between the saucer and a cup 46. Should the customer not use the cream provided, the package 42 remains sealed and may be refrigerated for subsequent service to another patron, and need not be wasted.

While I have described my invention in connection with the formation of cream packages, it will be apparent that the method and apparatus thereof may be employed for packaging other commodities, such as syrups or gravies, in a speedy and effective manner. Similarly, other bag materials than polyethylene may be employed, as polyvinyl chloride or other thermoplastics, and the sealing elements and thermostat may be readily modified to accommodate temperature and seal characteristics in known manner. Likewise, one or both of the transverse package seals may be weakened or notched to facilitate opening of the package by modification of the knife element in known fashion, without departing from the spirit and scope of my invention.

What is claimed is:

1. An apparatus for making filled tetrahedral packages from tubular thermoplastic stock comprising

a frame structure,

a vertical tube carried by said frame for slidably receiving therein a liquid-filled elongated thermoplastic bag which depends therefrom,

a table mounted on said frame for movement between a first position in which said table horizontally underlies said tube to support the bag depending therefrom and a second position in which said table is in non-supporting relation to said bag,

a pair of opposed heat sealing and severing jaws disposed between said tube and said table to lie on either side of the bag extending therebetween and relatively movable between a bag clamping, sealing and severing position and an open bag-releasing position,

and means for effecting relative rotation between said jaws and said bag through a 90° arc whereby successive spaced transverse seals of said bag are perpendicular to each other to form a tetrahedral package.

2. The apparatus of claim 1 further including means disposing said table in said second position as said jaws

are adjacent said bag clamping position to permit a filled, sealed, and severed package formed from the lowermost portion of said bag to drop therefrom.

3. The apparatus of claim 2 further including means for disposing said table in said first position when said jaws are in said bag-releasing position, to intercept and support said bag in gravitally descending past said jaws.

4. The apparatus of claim 3 wherein one of said jaws is fixed and extends into the path of the bag to thereby retard gravital descent thereof.

5. The apparatus of claim 4 wherein the other of said jaws is movable and is provided with cam means cooperating with said table to effect shifting thereof to said second position.

6. The apparatus of claim 3 wherein said fixed jaw carries a transverse knife, and means for shielding said knife from said bag during gravital descent thereof.

7. The apparatus of claim 1 wherein said means for effecting relative rotation between said jaws and said bag comprises a rotatable mounting between said tube and said frame, whereby rotation of said tube through 90° about its longitudinal axis turns said bag therewithin a like amount.

8. The apparatus of claim 7 further including means for keying said bag to said tube to insure rotation therewith, said means comprising a longitudinally extending slot in the wall of said tube into which said flexible bag is slightly bulged by the liquid therewithin.

9. The apparatus of claim 8 wherein calibrations are provided adjacent said slot to indicate the number of packages that may be formed from the bag.

10. An apparatus for making filled tetrahedral packages from tubular thermoplastic stock comprising

means for slidably retaining an elongated liquid-filled thermoplastic bag in vertical position,

means for supporting said bag at its lower end against gravital sliding descent thereof,

bag gripping means spaced vertically above said supporting means acting at right angles to the longitudinal axis of said bag for transversely sealing and severing the said bag above the bottom thereof,

said gripping means also cooperating with said supporting means to withdraw the latter from bag-supporting relation to permit the severed bag lower portion to be gravitally discharged from the apparatus, while said gripping means prevents gravital descent of the remainder of said bag,

means for restoring said supporting means to bag-supporting relation to intercept said transversely sealed bag upon gravital descent thereof relative to said retaining means when said bag gripping means are released,

and means for rotating said bag through substantially 90° about its longitudinal axis, whereby subsequent actuation of said gripping means transeversely seals the lower portion of said bag at right angles to the previously formed transverse seal and severs the completed tetrahedral package from the bag.

11. In an apparatus for making filled tetrahedral packages from tubular thermoplastic stock comprising

a base,

a vertical standard extending upwardly therefrom,

a pair of clamps adjustably secured to said standard in vertically spaced relation,

a tube vertically rotatably supported within and guided by said clamps,

a movable support table adjustably secured to said standard in vertically spaced relation to and beneath said tube,

a fixed heat sealing jaw adjustably secured to said standard between said table and said tube,

a movable heat sealing jaw pivotally secured to one of said clamps,

means operably associated with said table and said movable jaw for moving said table in one direction when said movable jaw is adjacent said fixed jaw,

means for moving said table in the reverse direction when said movable jaw is remote from said fixed jaw,

and means for rotating said tube about its longitudinal axis.

12. A method of making filled tetrahderal packages comprising the steps of:

vertically supporting a filled open-ended elongated bag of thermoplastic material adjacent a sealing and severing assembly,

transversely sealing and severing said bag at a point vertically spaced from the lowermost end thereof,

permitting said bag to descend by gravity a predetermined distance relative to the sealing and severing assembly,

relatively rotating said bag and said sealing and severing assembly through 90°,

and transversely sealing and severing said bag at a point vertically spaced from the previously formed transverse seal to thereby form a tetrahedral package.

13. The method of claim 12 including the further steps of

gripping and supporting said bag at the locale of the second transverse seal,

and withdrawing support from the tetrahedral package therebeneath to permit said package to fall by gravity from the bag.

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