May 5, 1964 C. C. AUSTIN ETAL 3,132,028

METHOD FOR PACKAGING AN ARTICLE OF FOOD

Filed Nov. 6, 1961 4 Sheets-Sheet 1

FIG. 1

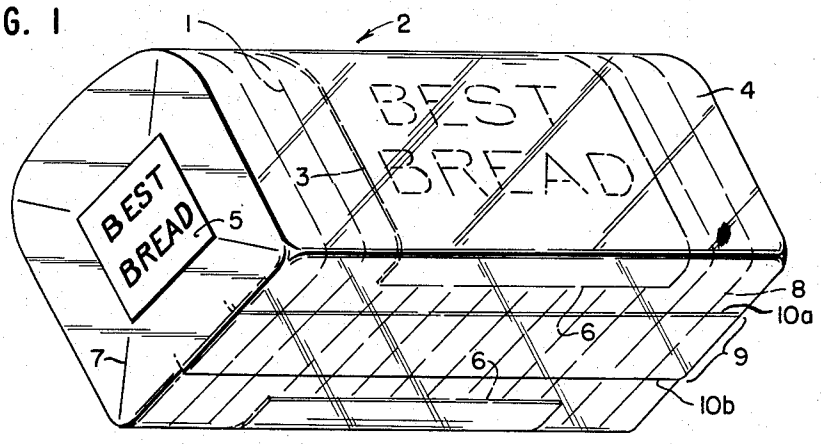
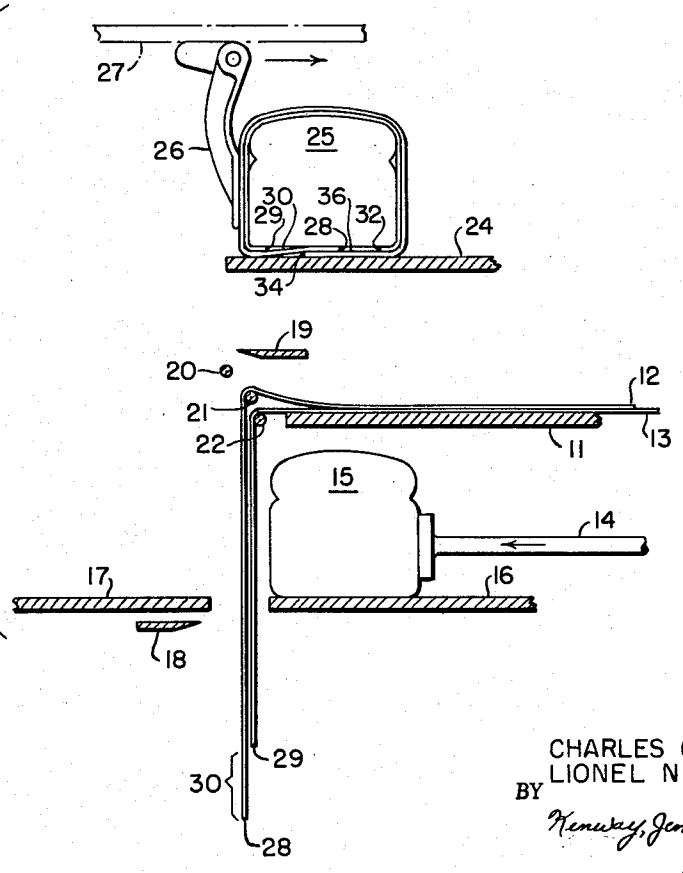


FIG. 2



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FIG. 3

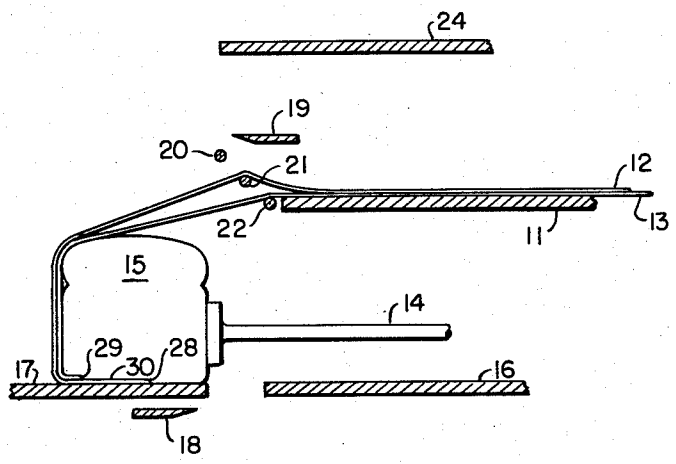
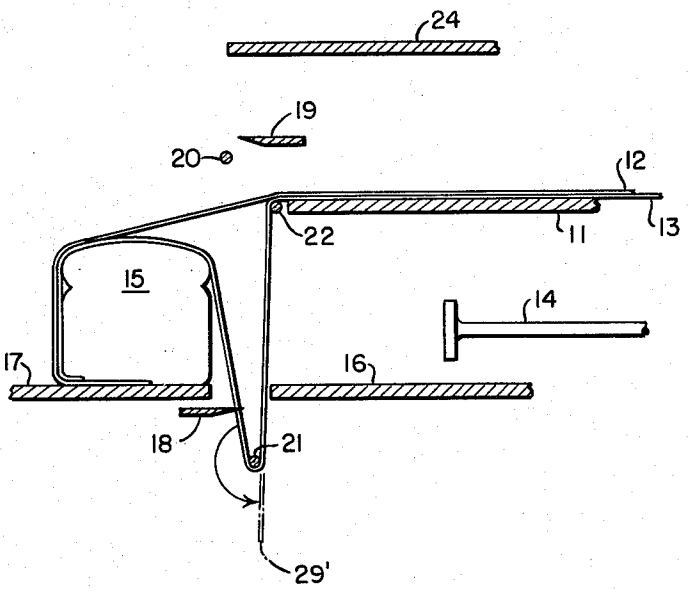


FIG. 4



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FIG. 5

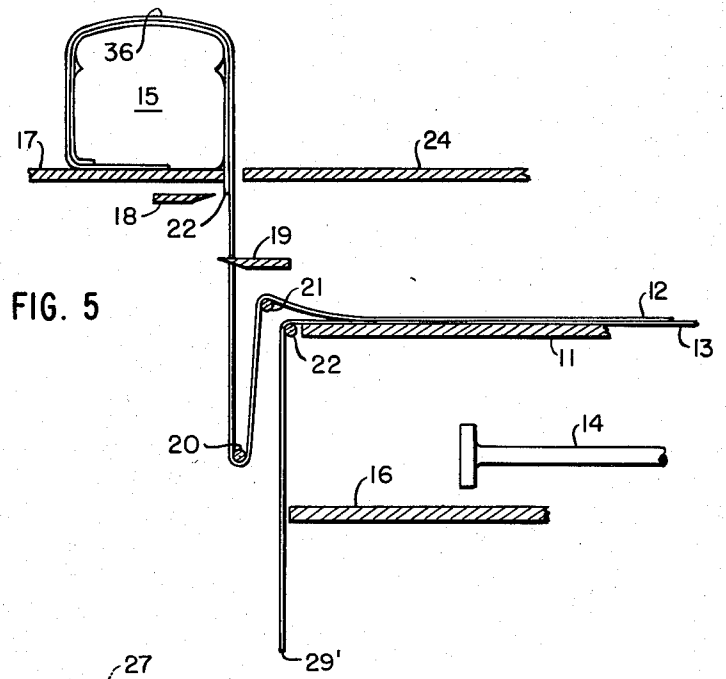
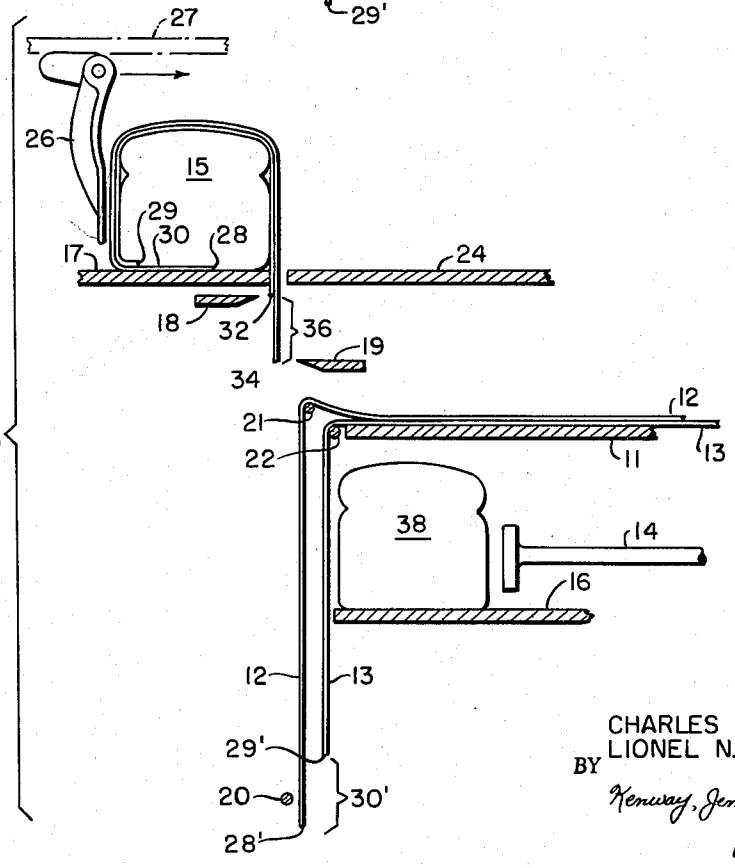


FIG. 6



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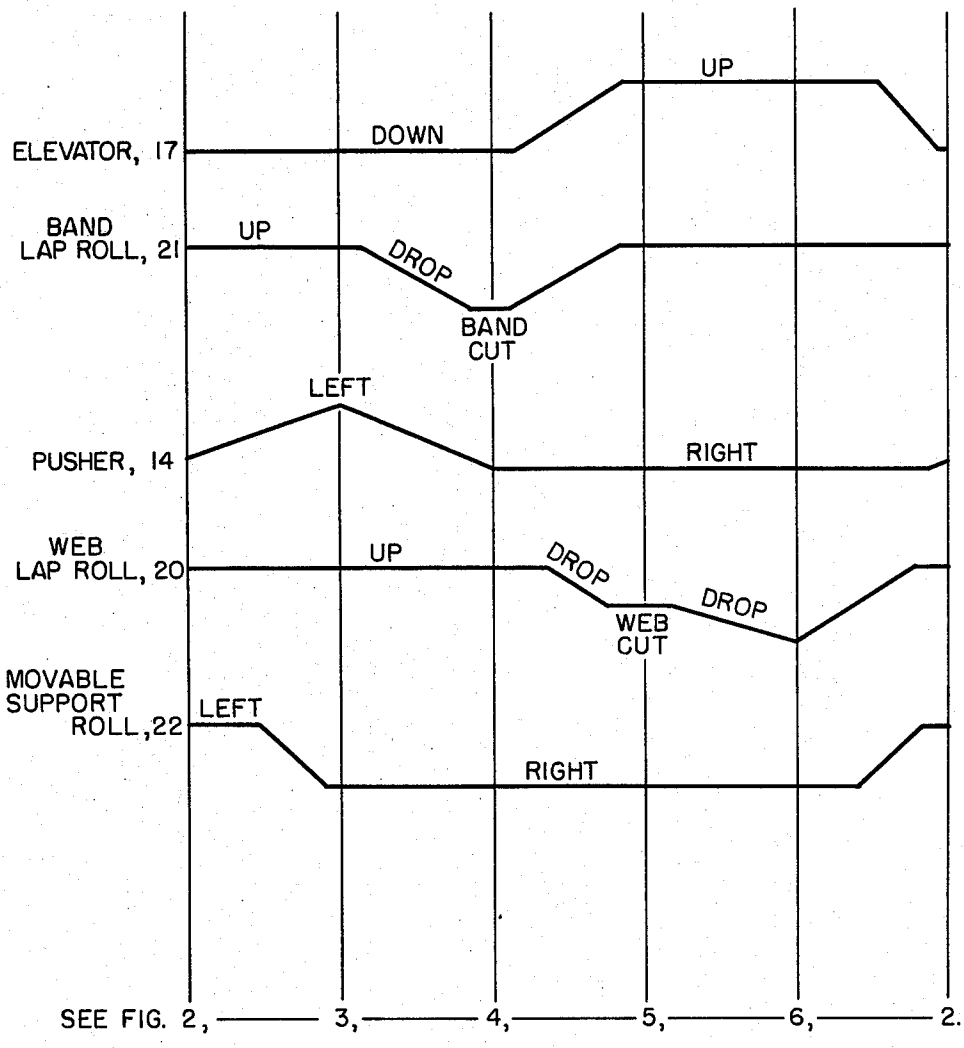


FIG. 7

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United States Patent Office 3,132,028 Patented May 5, 1964

3,132,028

METHOD FOR PACKAGING AN ARTICLE OF FOOD

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Filed Nov. 6, 1961, Ser. No. 150,503
3 Claims. (Cl. 99—171)

This invention relates to a package and packaging method for food articles, and is more particularly directed to an improved package and method for packaging loaves of bread and similar bakery products.

The present invention is concerned with a package of a type which includes a web of transparent material, such as a web of cellophane or other film coated with a thermoplastic heat-sealable resin composition, or a thermoplastic heat-sealable transparent film such as polyethylene, polypropylene, and the like, wrapped about the loaf with the sheet edges sealed in overlapping joints or folds at the bottom and end surfaces of the loaf to form a totally enclosing and generally vapor-proof covering for the loaf. Such packages further include a band of paper or similar material, printed with desired trademarks and other indicia, and inserted between the bread loaf and the wrapping web in such a manner that the printed surfaces will be visible through the transparent web.

The insertion of the band in the package is conventionally accomplished during a wrapping operation in automatic machines, by joining the band with the wrapping film in such a manner that the two arrive at a wrapping station as a multi-layer wrapping sheet. As a result of the various cutting, wrapping, and sealing steps in a conventional packaging operation, the printed band underlies the transparent sheet completely about the girth of the bread loaf, and is cut to a length equal to that of the web of wrapping material. By the term "length" in this description is meant that dimension which initially runs in the direction of wrapping web feed and which extends, in the final package, peripherally about the loaf. The ends of these equal lengths of band insert and wrapping web of the multilayer wrapping sheet form a joint, preferably underlying the bottom of the loaf, which comprises intercalated alternate layers of film and band material.

The strength of the joint or seal at the bottom of the loaf is dependent upon the degree of adhesiveness between the film and the band, and in instances where substantial amounts of an expensive type of heat-seal adhesive are not employed, separation or failure of this seal is not uncommon. A large percentage of bread packages, for example, presently employ the combination of polyethylene film wrapping sheets and wax-coated printed paper bands. The wax coatings on the insert bands serve, among other things, to preserve the fresh appearance of the band and to protect the loaves from foreign flavors which might accompany the band. The most important function of the wax coating, however, is that of furnishing an economical heat-activatable adhesive surface to improve the previously mentioned overlapping bottom seal. Although formulations for insert band coatings are continually being improved, the inherent incompatability of petroleum waxes and polyethylene results inevitably in the separation of these heat fused materials with resulting weakening or ultimate failure of the bottom package seal. Rapid degradation of the quality and freshness of the packaged loaf occurs as a result.

Such weak and undependable adhesive bonds are experienced with film and band combinations other than that occurring with wax and polyethylene. The use of films of polypropylene, rubber hydrochloride, polyethylene terephthalate, cellulose acetate, and coated regenerated cellulose and other films presenting surfaces difficult to adhere to, result in similar unsatisfactory bottom seals.

Solutions to the problem presented by the interleaved multilayer bottom seal construction have been proposed, including the use of highly adhesive heat seal compositions coated upon the insert band. Although effective in maintaining secure bottom seals, the use of such specialized adhesive coatings remains economically unfeasible since the widely practiced packaging methods and devices require an overall coating of the insert band. Partial coating of the band with the specific adhesive compositions, combined with intricate registration means necessary to allow automatic processing, is also undesirable.

It is the primary object of this invention to provide a package for bread loaves and the like which provides a longer period of storage protection for the contents.

It is a further object of this invention to provide an improved package and packaging method which afford a secure and economical bottom seal in bread loaf packages employing transparent wrapping films and band inserts.

It is another object of this invention to provide an improved and more economical package and packaging method of a kind which utilizes transparent wrapping films and band inserts.

It is still a further object of this invention to reduce the length of band insert consumed in packaging bread loaves and the like.

The thermoplastic adhesive properties of wrapping films, and various film coatings, as with the regenerated cellulose films, provide a means for forming joints and seals of remarkable strength and integrity, when such film materials are mutually bonded to one another by the application of heat. The bonds thus formed are of a cohesive rather than adhesive nature and permanent compatability and seal strength is insured.

According to the present invention, advantage is taken of the superiority of such mutual cohesive seals by eliminating the conventional interleaved ends of the insert band from the joint or seal underlying the bottom of the loaf. The resulting joint structure consists of one end portion of the transparent web lying in direct contact with the opposite end portion of the web, so that application of heat to the joint results in secure sealing of the two web layers. The joint lies intermediate the leading and trailing edges of the band, which are shortened to permit this direct web-to-web seal.

In addition to the improvement in the bottom seal of the bread loaf package of this invention, an additional economic advantage is secured. In conventional bread loaf packages characterized by equal lengths of transparent wrapping web and insert band, the length of insert band underlying the bottom of the loaf, in addition to interfering with the bottom seal, is wasted because any printed identification or design thereon is not visible to the consumer. Removal of these underlying sections of the band results in a saving of a proportionate amount of the band cost with no loss in useful advertising or printing space on the package.

A further reduction in the cost of this package results from the fact that the wax composition coated on the insert band need no longer be compound to furnish the relatively high degree of adhesiveness previously necessary in the formation of interleaved bottom seals. Simple inexpensive wax compositions will suffice for coatings of the insert bands used in this novel package.

According to a preferred mode of carrying out the packaging method of this invention in a repetitive man-

ner, indefinite lengths of web and band are arranged in overlapping longitudinally-aligned relationship, and in an initial cycle, a leading-edge portion of the web is extended forwardly of a leading edge of the band. In subsequent cycles, this step is carried out by an intermediate step in the preceding cycle of the process, which thus lends itself to repetition. The web and band are then wrapped partially about a loaf of bread or the like, preferably beginning with the leading edges engaging the bottom surface of the loaf, in such a fashion that the web envelops and overlies the band and the loaf. The band is then drawn further about the loaf and sheared to form a trailing edge in the wrapped sheet of band, the sheet being of such length as to overlap a portion of the bottom of the loaf, but falling short of the band's leading edge, so as not to overlap the aforementioned web leading-edge portion. The web is then wrapped further about the loaf and is sheared to form a trailing edge in the wrapped sheet of web, which is of such length as to extend rearwardly of the trailing band edge, to form a web trailing-edge portion which is subsequently wrapped to overlap and directly engage the web's leading-edge portion. The overlapped edge portions of the web are then sealed directly to one another, as by the application of heat, and the ends of the package are sealed in the same or any other conventional manner to complete the packaging operation and hermetically seal the loaf.

In a repetitive cycle, the steps of shearing the band, and then shearing the web rearwardly of the trailing edge of the band, are each carried out separately after first drawing out new lengths of band and web, respectively; the web length is drawn out to a greater extent than the band length, so that the shearing steps form the leading edge of the next portion of web forwardly of the leading edge of the next portion of band, to pre-arrange the wrapper elements for carrying out the next repetition of the packaging cycle to wrap a succeeding loaf.

While the specification concludes with claims particularly pointing out the subject matter which is regarded as the invention, it is believed that a clearer understanding may be gained from the following detailed description of preferred embodiments thereof, referring to the accompanying drawings, in which:

FIG. 1 is a pictorial view showing a preferred embodiment of the improved package;

FIGS. 2–6 are schematic views showing the successive steps of a preferred mode of carrying out the packaging method by means of automatic packaging machinery; and

FIG. 7 is a graphic illustration of the sequence of operations of the machine elements in FIGS. 2–6.

In FIG. 1 of the accompanying drawings, a loaf of bread **1** is shown wrapped in a preferred embodiment of the improved bread loaf package **2**, as it would generally appear upon the market shelf, with a printed paper band **3** and the bread loaf visible through an enclosing web **4** of transparent flexible film material. At one end of the package there is shown an adhesive sheet or end label **5** conventionally employed to supplement the heat sealed closure of the overlapping folds **7** of transparent web material. It is common practice to apply an end label to each end of a bread loaf package and it is not to be infered herein that such a label or application is intended to represent in itself any part of the present invention.

The ends **6** of the printed band **3** underlie the bottom surface **8** of the bread loaf, but do not extend to its center; according to the invention, they terminate in spaced-apart relation, to permit the formation of a direct web-to-web seal **9** in overlapping web end or edge portions defined between a leading edge **10***a* and a trailing edge **10***b* of the wrapped web. The end portions of the web underlying the loaf thereby form a face-to-face sealable overlap extending the length of the central portion of the package bottom. Application of heat to the bottom of the package, particularly in the overlap area, results in activation of the adhesive coating of the wrapping material, or alternatively in softening of the thermoplastic film itself, whereby a strong leak-proof bond is formed between the overlapped end portions of the web.

Referring to FIGS. 2–7, the improved packaging process is illustrated as it may be performed by automatic bread wrapping machinery, which is generally of a conventional type illustrated and described by the co-pending application of Henry T. Pauk and Frederick Spaney, Jr. filed October 24, 1961, entitled Bread Wrapping Method and Apparatus, and assigned to the same assignee as the present application. The machine includes a table **11** for feeding an indefinite length of a transparent web material **12** and a printed band material **13** longitudinally toward a wrapping station, with the band underlying the web and aligned longitudinally therewith. The band is of lesser width than the web, and may be arranged centrally thereof in the lateral direction. A pusher **14** is arranged for movement in the direction shown by the arrow to transfer a loaf of bread **15** from an input feed tray **16** to a spaced-apart elevator table **17**, for partially wrapping the loaf within the composite wrapper formed by the band and web. A shear **18** is mounted on a lower surface of the elevator table, for movement relative thereto in a direction to shear the band to form successive trailing and leading edges therein; and a further shear **19** is mounted above the table **11** for horizontal movement to shear the web.

In conventional machines, a single lap roller is provided to draw a trailing edge of the composite wrapper downwardly, about the right-hand side of the loaf as viewed in the drawings, and also to draw out new lengths of material to form a succeeding wrapper. According to the improved process, however, independent lap rollers are provided for the band and the web, and these comprise a web lap roller **20** and a band lap roller **21**, the latter of which serves to support the web when in the position shown in FIG. 2. Additionally, a movable band support roller **22** is arranged to support the leading edge of the band in a desired position. The lap rolls, as well as the elevator table **17**, are arranged for substantially vertical movement by any suitable means, to various relative positions shown in the remaining figures for carrying out sequential steps of the process.

A delivery runway **24** is stationarily supported above the lap rolls for the discharge of a preceding wrapped loaf **25** from the machine, by means of a series of pusher arms **26** carried by an endless chain conveyor **27**. The elevator table **17** may be raised to the level of the runway **24** to deliver wrapped loaves for discharge by the pusher arms.

In connection with the description of the steps of the process which follows, reference may be had not only to FIGS. 2–6, but to FIG. 7, in which the sequential stages numbered 2–6 indicate the relative positions of the elevator **17**, the band lap roll **21**, the pusher **14**, the web lap roll **20**, and the movable support roll **22**, shown in the correspondingly-numbered figures. It will be understood that the process is adapted to cyclical repetition.

In an initial phase of the packaging operation, the leading edge **28** of the web extends forwardly of the leading edge **29** of the band to form a web leading-edge portion **30**. The terms "forwardly" and "rearwardly" as used in this description refer to the longitudinal directions of web and band feed. The movable support roll **22** is held in a position beneath the band lap roll **21**, to bring the free ends of the web and band into close juxtaposition for engagement by the loaf **15** to commence the wrapping operation.

As shown in FIG. 3, the web and band are partially wrapped about the loaf **15** by the movement of the latter onto the elevator table **17**, with the protruding web leading-edge portion **30** and the leading edge **29** of the band underlying the bottom surface of the loaf. The remaining elements maintain their positions during this operation except that upon engagement of the wrapper by the loaf, the movable support roller is carried to the right as viewed in FIG. 3, to permit subsequent downward movement of the band lap roll **21**.

Referring to FIG. 4, the band lap roll **21** then drops downwardly to draw out a new length of band for a succeeding wrap, to bring the trailing-edge portion of the preceding sheet of band downwardly about the right side of the loaf **15**, and dwells temporarily for cutting of a trailing edge in the band by means of the shear **18**. During this phase of operation, the pusher **14** is withdrawn to the right as indicated by the arrow in FIG. 4, preparatory to receiving a succeeding loaf. After being sheared, the newly-formed leading edge **29'** of the length of band drops downwardly as shown by the arrow, and the trailing edge **32** formed in the preceding sheet of band depends freely from the loaf. The band sheet is cut at such a length that upon subsequent wrapping of the trailing edge **32** under the loaf, it terminates in spaced-apart relation to the leading edge **29**, as shown in FIG. 2 in relation to the preceding loaf **25**.

While the trailing edge of the band may abut or even overlap the web leading-edge portion **30**, within the broader aspects of the invention, it must terminate forwardly of the trailing edge of the web, in order that direct contact may be made between the leading and trailing edges of the web. Furthermore, the band preferably extends only slightly under the lower right-hand corner of the loaf, to reduce to a minimum the length of band material consumed by each wrapping.

The band lap roll **21** is then raised toward its former position, shown in FIG. 5. The web lap roll **20** is lowered to the intermediate position shown, to draw out a succeeding web length for a subsequent wrapping operation, to draw the trailing end of the web downwardly over the right side of the loaf, and to support the web in a position to be cut by the shear **19** at a desired length. Concurrently, the elevator **17** rises to a raised position level with the runway **24**, and the shear **19** then cuts a trailing edge **34** to terminate the preceding sheet of web. The parts are positioned in FIG. 5 in such juxtaposition that the lineal length of web between the top center point **36** of the loaf and the shear **19** is equal to the lineal length of web extending between the shear and the band lap roller **21** supporting the length of web; in this manner, it is insured that the length of web extending from the top center point **36** about each half of each successive loaf will be equal. The length of web is drawn forwardly to a greater extent than was the length of band, so that a leading-edge portion **30'** of the web extends forwardly of the leading edge **29'** of the band. Subsequent to the shearing step, the new leading edge **28'** of the succeeding length of web falls to the position shown in FIG. 6, and this movement is assisted by further downward movement of the web lap roller **20**.

Subsequent to shearing of the web, the loaf **15** is carried to the right by a pusher arm **26** and the conveyor **27**. As the loaf traverses from the elevator table to the runway **24**, the trailing edge **32** of the band, and a web trailing-edge portion **36** formed by the rearward protrusion of the web trailing edge **34**, are wrapped under the loaf, as shown in FIG. 2 in relation to the preceding loaf **25**, in such a manner that the web leading- and trailing-edge portions **30** and **34** overlap in direct surface contact for subsequent sealing by the application of heat and/or pressure. Sealing may be obtained by means of suitable adhesives previously applied to the web surfaces, but is preferably secured by direct fusion or adhesion of the web material to itself. The seal lies intermediate the leading and trailing ends **29** and **32** of the band.

Referring again to FIG. 6, a succeeding loaf **38** is introduced onto the tray **16** as the preceding loaf **15** is discharged, and the parts return to their initial positions of FIG. 2, in preparation for the wrapping of this new loaf. The leading-edge portions **28'** and **29'** of the web and band, respectively, have been prepared by the preceding cycle for wrapping the new loaf, by the formation of a protruding web leading-edge portion **30'**.

While the method of the invention has been shown as it may be carried out in a preferred manner by automatic machinery, it will be understood that the process may alternatively be performed by other machinery, or by hand.

In a bread package embodying the present invention, it is unnecessary that any substantial adhesive bonding be accomplished between the insert band and the outer film wrapper, as was required in previously-known bread loaf packages. It may be advantageous in some applications, however, that the simple wax coating of the insert band, used primarily for protection of the band and food product as aforementioned, be employed as a heat-bonding agent for superficially joining the insert band and outer web wrapper. In this manner the overall appearance of the package might be improved.

These and other variations of the novel package of this invention may readily occur to those skilled in the art and be accomplished by the exercise of ordinary mechanical skill. It is anticipated that particular embodiments of the package and packaging method described herein may be respectively constructed and performed according to specific requirements, without departing from the true spirit and scope of the invention.

What is claimed is:

1. The method of packaging a food article, which comprises the steps of partially wrapping an indefinite length of web and an indefinite length of band in longitudinally-aligned relationship about a food article in such manner that said web overlies said article and said band, shearing and wrapping said length of band to form a trailing edge therein terminating a sheet of wrapped band, drawing said indefinite length of web forwardly with respect to the remainder of said indefinite length of band without altering the longitudinal juxtaposition of the portion of said length of web and said band sheet previously wrapped about the article, shearing and wrapping said length of web to form a trailing edge thereof terminating a sheet of wrapped web of a length enveloping said article and forming a trailing-edge portion in said web sheet protruding rearwardly of said band sheet and overlapping a leading-edge portion of said web sheet in direct engagement therewith, sealing said leading-edge portion and said trailing-edge portion of said web sheet to form a direct web-to-web bond therebetween, and sealing the ends of the wrapped food article.

2. The method of individually packaging successive food articles, which comprises the steps of wrapping an indefinite length of web material and an indefinite length of band material of lesser width than said web material arranged in longitudinally-aligned relationship partially about a food article in such manner that said web overlies said article and said band but a leading-edge portion of said web extends forwardly of a leading edge of said band and directly engages said article, shearing and wrapping said length of band to form a new leading edge therein and also a trailing edge to terminate a sheet of wrapped band of a length engaging said article with said leading and trailing edges of said band sheet spaced apart on the surface of the article, drawing said indefinite length of web forwardly with respect to the remainder of said length of band without disturbing the longitudinal juxtaposition of the portions of said length of web and said band sheet previously wrapped

about said article, shearing and wrapping said length of web to form a trailing edge to terminate a sheet of wrapped web of a length enveloping said article and forming a trailing-edge portion in said web sheet protruding rearwardly of said band sheet and overlapping said leading-edge portion of said web sheet in direct engagement therewith, said last-mentioned shearing step also forming a new leading edge in said indefinite length of web such that a new leading-edge portion of said indefinite length of web protrudes forwardly of said new leading edge of said indefinite length of band for wrapping a succeeding article, sealing said leading-edge portion and said trailing-edge portion of said web sheet to form a direct web-to-web bond therebetween, and sealing the ends of the wrapped food article.

3. The method of individually packaging successive food articles, which comprises the steps, in only an initial cycle, of; arranging an indefinite length of web material and an indefinite length of band material of lesser width than said web material in longitudinally-aligned relationship, and shearing said band and said web to form longitudinally spaced-apart leading edges therein such that a leading-edge portion of said web protrudes forwardly of a leading edge of said band; and the steps, in a repeatable cycle, of wrapping lengths of said web and said band partially about a food article in such manner that said web overlies said article and said band but said leading-edge portion of said web directly engages said article, shearing and wrapping said length of band to form a new leading edge in said indefinite length of band and also a trailing edge to terminate a sheet of wrapped band of a length engaging said article with said leading and trailing edges of said band sheet spaced apart on the surface of the article, drawing said indefinite length of web forwardly with respect to the remainder of said indefinite length of band without disturbing the longitudinal juxtaposition of the portions of said length of web and said band sheet previously wrapped about said article, shearing and wrapping said length of web to form a trailing edge to terminate a sheet of wrapped web of a length enveloping said article and forming a trailing-edge portion in said web sheet protruding rearwardly of said band sheet and overlapping said leading-edge portion of said web sheet in direct engagement therewith, said last-mentioned shearing step also forming a new leading edge in said indefinite length of web such that a new leading-edge portion of said indefinite length of web protrudes forwardly of said new leading edge of said indefinite length of band for wrapping a succeeding article, sealing said leading-edge portion and said trailing-edge portion of said web sheet to form a direct web-to-web bond therebetween, and sealing the ends of the wrapped food article.

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