

July 22, 1958

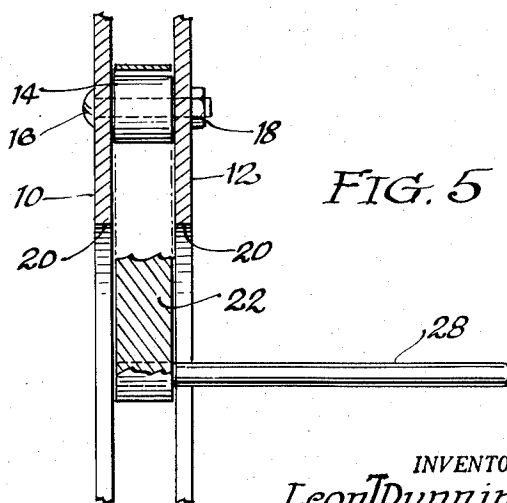
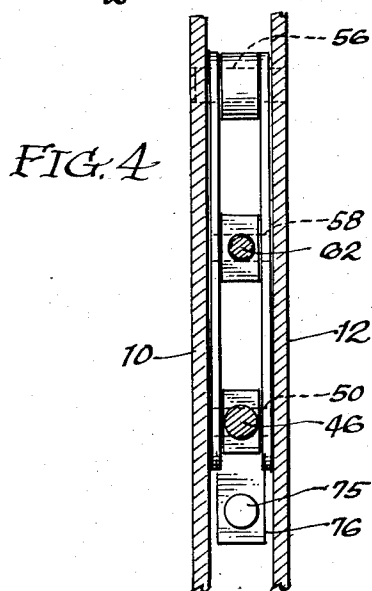
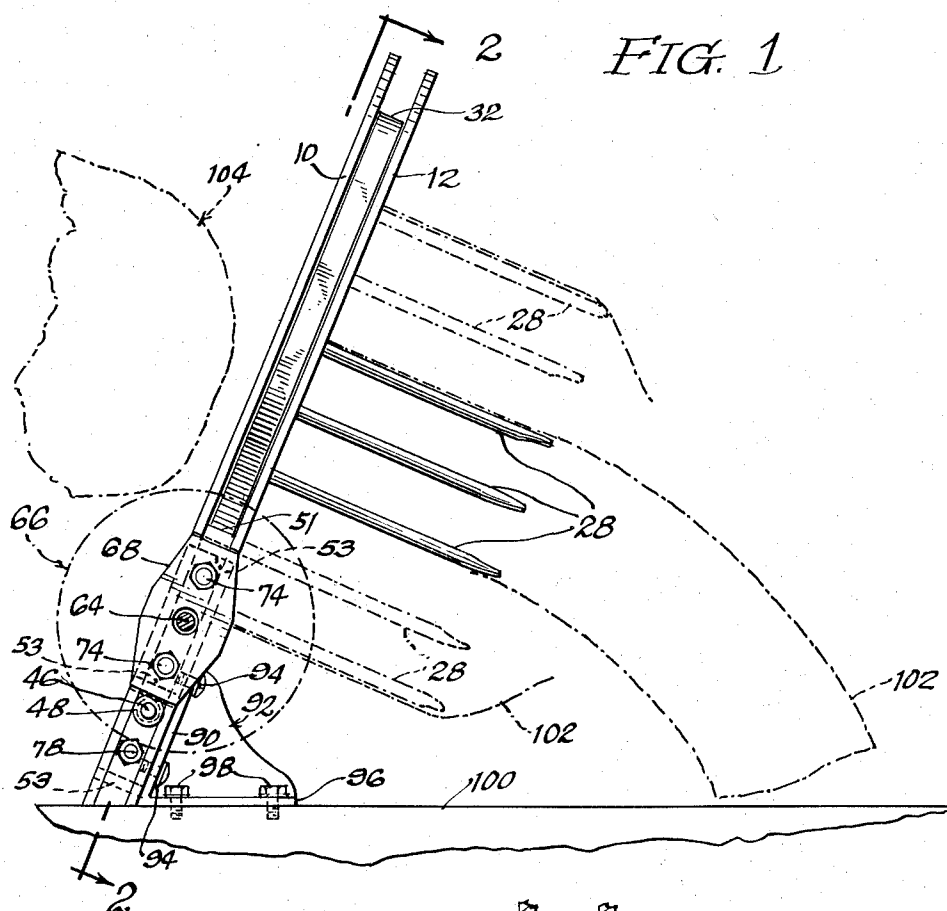
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2,843,984

APPARATUS FOR PACKAGING ENVELOPMENT

Filed May 17, 1955

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 2

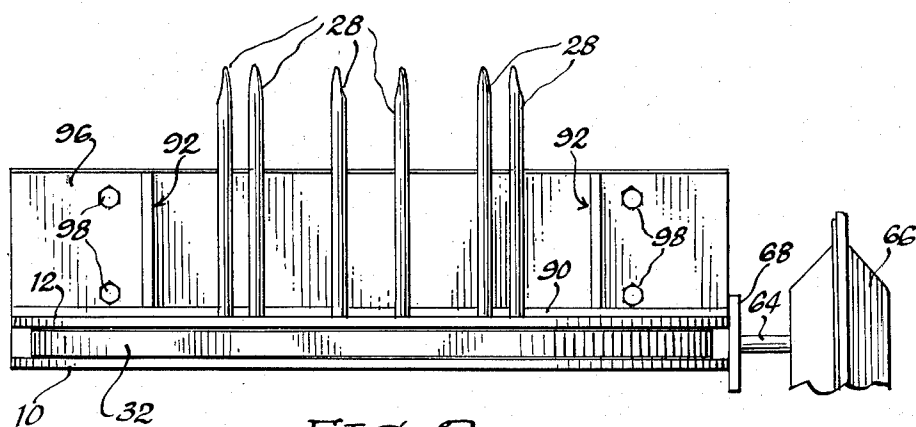
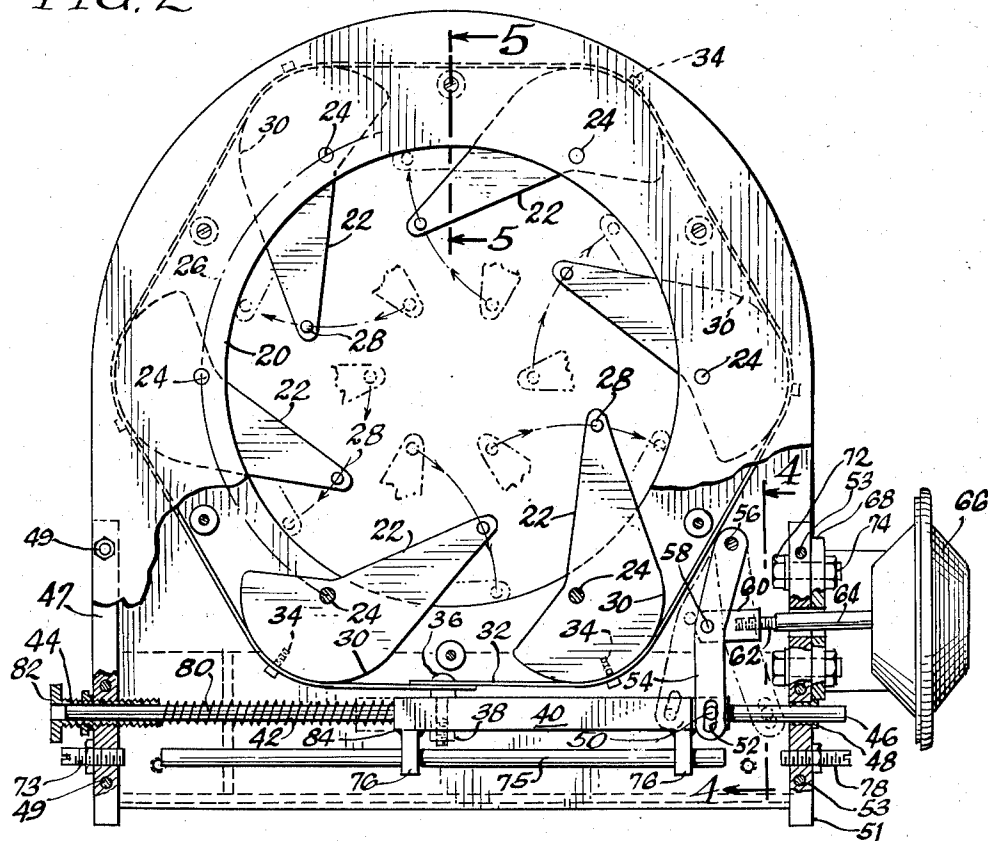


FIG. 3

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APPARATUS FOR PACKAGING ENVELOPMENT

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Application May 17, 1955, Serial No. 509,015

4 Claims. (Cl. 53—184)

This invention relates to packaging. More particularly it relates to an apparatus for providing a wrap which intimately conforms and clings to the packaged item.

In the packaging of many food items such as, for example, cheeses and meat food products, as well as poultry in the whole, sliced or cut-up state, it is highly desirable that there be substantially no interspaces between the wrapper and the surface of the item. When such interspaces were present, they constituted pockets in which air serving as a source of oxygen was entrapped and produced undesirable results. The pockets also permitted fluids which served as nutrient broth for the growth of undesirable molds to collect therein. Moreover, because the wrap did not intimately cling to the packaged item, it was apt to be ruptured, punctured or otherwise damaged during handling or storage and also tended to mask the true color of the packaged item.

Envelopes, tubes, bags, pouches (all hereinafter referred to as bags) made of a thin, flexible, plastic film which is elastic, i. e., has the property of stretching upon application of stress and self-recovery upon removal of the stress, are known. It has been proposed to stretch a bag made of an elastic film in which the selected item is to be packaged and whose normal perimeter is smaller than that of the item to be packaged therein to a perimeter greater than that of the item so that the latter can be easily inserted into the stretched bag while the bag was maintained in the stretched condition and thereafter releasing the stretching stress whereupon the bag will of its own accord contract and form a tightly adhering wrap. In order to carry out the aforementioned procedure, it is necessary to provide an apparatus to stretch the bag and maintain it in stretched condition until the item has been inserted.

An object of this invention is to provide an apparatus to apply a uniform, controlled stretch to a bag made of an elastic material and maintain it in the stretched condition so that the item to be packaged can be easily inserted therein.

Other and additional objects will become apparent hereinafter.

The above objects are accomplished, in general, by uniformly stretching a bag of an elastic film and whose normal perimeter is smaller than that of the item to a perimeter greater than that of the item so that the latter can be easily inserted into the stretched bag, and after inserting the item in the bag while maintained in the stretched condition, releasing the stretching stress whereupon the bag will, of its own accord, contract and form a tightly adherent and clinging wrap.

The stretching operation is obtained by inserting a plurality of fingers into the bag and then imparting relative movement to the fingers in a direction to impart the desired stretch. The bag can be stretched throughout its entire length or only along a portion of its length so that the unstretched portion aids in positioning and locating the item within the wrap.

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In accordance with this invention, a plurality of outwardly extending fingers to be inserted in the bag are arranged in uniform spaced relationship to provide a passage therebetween through which the item to be packaged is passed in the inserting operation. Each finger is individually carried by a separate support which is pivotally mounted so that upon rotation of the support in the appropriate direction, the perimeter about the fingers will be increased or decreased. Means are provided to actuate the finger supports for movement in the desired direction.

The pivots on which the finger supports are mounted are arranged secured in spaced relationship about an opening in a frame through which the item to be packaged is to be passed. Because of the construction of the finger supports, the fingers carried thereby are also disposed in spaced relationship about the opening in the frame to provide a passage into which the item passing through the aforementioned passage will pass.

In the preferred embodiment, each finger support is provided with a cam edge which is rigidly secured to a metal band so that upon movement of the band in the appropriate direction, all of the finger supports will be moved uniformly in unison in the same direction and thereby expand or contract the fingers to increase or decrease the periphery thereabout. Means are provided to impart movement to the band. Stops, preferably adjustable, are also provided to limit the movement of the band in either direction whereby the extent of the movement of the fingers in either direction is controlled. By appropriate adjustment of the stops, the apparatus can be made to function with different sizes of tubes or pouches.

Normally, the initial position of the finger supports are such that the fingers carried thereon are in a contracted position and can be quickly and easily inserted in the bag, and the final position is such that the fingers are in an expanded position whereby the bag on the fingers will be circumferentially stretched and its perimeter enlarged sufficiently to permit easy insertion of the item in the bag.

The band actuating mechanism is one which will impart gradual and uniform movement to the fingers during expansion and contracting operations. Also, during the contracting operation, the stretching fingers, prior to removal from the package, will not press too tightly against the item. In practice, when the tension on the bag is released at the start of the finger contracting operation, the bag, together with the item therein, is easily pulled or pushed on the stretching fingers. The open end of the package can be heat sealed, tied or twisted as desired.

As previously mentioned, the bag constituting the wrap can be formed of any film which is elastic, i. e., has the property of stretching upon application of stress and self-recovery upon removal of stress. Preferably the film is thermoplastic and heat sealable, in addition to being transparent, flexible, non-toxic, printable, tasteless, imparts no undesirable odor or taste to the packaged item, strong, tough, waterproof, low moisture vapor transmission rate and gas transmission rates appropriate for the packaged item. Polyethylene film sold under the trademark Visqueen and film made of polymer (butadiene acrylonitrile copolymer) plasticized vinyl resin (vinyl chloride vinyl acetate copolymer) sold under the trademark Visten are preferred examples of elastic film which can be formed into tubes or bags for use in this invention.

The film can be in the form of seamless tubing of desired lengths, with or without gussets, and open at both ends or sealed at one end by a straight across or arcuate seal. The invention is not restricted to seamless tubes or bags made therefrom. It is equally applicable to tubes having a longitudinal seam obtained by overlapping the

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marginal edges of the film and to bags made therefrom, as well as tubes and bags made by sealing the edges of two superposed layers of appropriate film.

The nature of the invention will become more apparent from the following description, appended claims and accompanying drawings wherein:

Figure 1 is a vertical side view of the apparatus showing the distending fingers, in full lines, at the beginning of the stretching operation and in dotted lines at the end of the stretching operation.

Figure 2 is a section taken on line 2—2 of Figure 1.

Figure 3 is a top view of Figure 2.

Figure 4 is a section taken on line 4—4 of Figure 2.

Figure 5 is a section taken on line 5—5 of Figure 2.

Referring now to the drawings wherein like reference numerals designate like parts, the reference numerals 10 and 12 designate a pair of plates constituting the frame of the apparatus. A plurality of spacers 14 maintain plates 10 and 12 in spaced relationship and the plates 10 and 12, as well as the spacers 14, are secured together in any appropriate manner as by bolts 16 and nuts 18. Plates 10 and 12 are provided with aligned circular openings 20 to permit, as will hereafter be more fully explained, the passage therethrough of the item to be packaged.

A plurality of finger supports 22 are disposed between plates 10 and 12 and each of said supports 22 is rotatably mounted on a separate pivot 24 secured between the plates. Pivots 24 are disposed in uniform spaced relationship about a circle, designated by the reference numeral 26, concentric with central openings 20.

As shown in Figure 2, each finger support 22 is eccentric in shape and a cantilevered distending finger 28 disposed at right angles thereto is secured thereto adjacent its inner end. Fingers 28 are thus disposed in a circle about central openings 20 and provided a passage, the center of which is in alignment with that of central openings 20 whereby an item which has passed through said openings will enter into the passage. As also shown in Figure 2, each finger support 22 is formed at its opposite end with a circular edge cam section 30 whereby rotary movement may be imparted to the supports as will now be described.

A continuous metal band 32 is positioned between plates 10 and 12 and it encircles all the finger supports 22 and contacts the respective cam portions 30 thereof. Metal band 32 is secured at identical positions to each of supports 22 by means of screws 34. Metal band 32 is secured by bolt 36 and nut 38 to reciprocable connecting rod 40. As shown in Figure 2, the leading portion 42 of rod 40 is circular in cross-section and is slidably mounted in bushing 44 threadedly secured in spacer 47 mounted between and secured to plates 10 and 12 in any appropriate manner as by bolts 49. The trailing portion 46 of rod 40 is likewise circular in cross-section and is slidably mounted in bushing 48 carried in spacer 51 mounted between plates 10 and 12 in any appropriate manner as by bolts 53. A pin 50 on rod 40 cooperates with slot 52 at one end of link 54, which is pivotally mounted on the frame as at 56. Intermediate its ends, link 54 is appropriately secured at 58 to block 60 in which threaded end 62 of piston rod 64 is threadedly secured. The opposite end of piston rod 64 is secured to the diaphragm of a compressed air operating diaphragm unit 66 which is carried on plate 68 secured to spacer 51 by means of bolts 72 and nuts 74. Compressed air diaphragm unit 66 is the well known Bendix-Westinghouse Robotair and since the specific details thereof form no part of this invention, further description thereof is unnecessary.

It is manifest that upon actuation of compressed air diaphragm unit 66, piston rod 64 will be actuated and its motion transferred respectively through link 54, to rod 40, to metal band 32 and finally to finger supports 22. When piston rod 64 is actuated through the compressed air diaphragm unit 66, to travel to the left as shown in

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Figure 2 and fingers 28 will be expanded and when it is actuated to travel in the opposite direction, fingers 28 will be contracted or collapsed. Adjustable stop 73 threadedly secured in spacer 47 cooperates with one end of bar 75 secured to holders 76 suspended from rod 40 to limit movement of rod 40 in one direction and adjustable stop 78 threadedly secured in spacer 51 cooperates with the opposite end of bar 75 and limits movement of rod 40 in opposite direction. As is apparent by appropriate adjustment of stops 73 and 78, the expansion and contraction of fingers 28 can be limited as desired.

Spring 80, the forward end of which cooperates with spring adjustment screw 82 and the rear end cooperates with shoulder 84 of rod 40, cooperates with the air release of unit 66 to control the rate of movement of piston 64 in its return stroke to collapse fingers 28.

To facilitate the insertion of the item to be packaged, frame members 10 and 12 are inclined as shown in Figure 1. Flange 90 of brace 92 of appropriate shape is secured to frame member 10 by means of screws 94 and bottom flange 96 is secured by screws 98 to any suitable support such as a table 100.

Though in the drawings, central opening 20 is circular, the invention is not restricted thereto. It can be of any other geometric shape such as rectangular, square, triangular, as desired, provided, of course, it is sufficiently large to permit the item to be packaged to pass therethrough with ease.

The invention does not require any precise number of finger supports and fingers. Though in the embodiment described, six finger supports, each carrying a finger, are utilized, a greater or lesser number can be utilized.

In general, the arrangement of the fingers about the opening depends on the shape of the opening which in turn depends on the shape of the item. Thus, the fingers can be arranged to provide a passage of the same geometrical shape as the opening. However, it is to be noted that when there are, for example, 6 or 8 fingers arranged in a circle about the opening, by not inserting one, two or more fingers into the bag, the latter can be made to assume shapes other than circular or substantially circular.

The fingers need not be of any special shape. In order to prevent damage to the bag at least the portion of the fingers contacting the bag are smooth and rounded. Preferably, the free ends are cut away to facilitate insertion in the bag.

The fingers can be made of lengths so that they will circumferentially stretch a bag throughout its entire length, alternatively they can be made of lengths as will stretch only a portion of the length of the bag in which case the item can be forced into the unstretched portion whereby the item itself will stretch the bag.

In operation, stop 78 is adjusted so that when the trailing end of bar 75 is in contact therewith, finger supports 22 will position fingers 28 so that the perimeter about such fingers will be smaller than that of bag 102 into which item 104 is to be inserted and stop 73 is adjusted so that when the leading end of bar 75 is in contact therewith, finger supports 22 will position fingers 28 so that the perimeter thereabout will be sufficiently large to permit item 104 to be passed therethrough. After the aforementioned adjustments have been made, fingers 28 are inserted in bag 102 as shown in Figure 1. Compressed air diaphragm unit 66 is then actuated and rod 40 is moved to the left in Figure 1 until the leading end of rod 75 contacts stop 73. During this operation, the linear movement of rod 40 is communicated to metal band 32 which in turn rotates finger supports 22 in a clockwise direction and enlarges the periphery about fingers 28 which in turn circumferentially stretches bag 102 in contact therewith. Item 104 is then inserted through central opening 20 from which it passes into the passage formed by fingers 28. When item 104 has been suitably disposed in the film pouch, air is released

from the diaphragm unit 66 and motion of all actuating components is reversed whereby fingers 28 are contracted. Spring 80 which had been compressed during the movement of rod to the left in Figure 2 cooperates with the air release to control the return movements of the actuating components. The return stroke is at a rate faster than the return recovery of the bag. Thus, shortly after the return stroke begins, the bag becomes loose around the stretching fingers and at that time the bag and contents can be removed from the apparatus. After removal of the bag and contents, the return stroke completes its movement. In the meantime, the bag continues its recovery and forms itself tightly about the item. The open end or ends are then appropriately sealed.

The invention provides an apparatus for use in producing packages in which the wrap tightly adheres and clings to the contents. Because of this, no interspaces between the wrap and the surface and particularly cut surface or surfaces of the contents are present and the undesirable effects resulting from interspaces are avoided.

The invention can be used for tightly wrapping or tightly overwrapping or tightly covering various prepared meat food items such as sliced luncheon meats, sliced cooked ham, sliced bacon, sliced sausage, chunks of sausage, ring bologna, blocks of cheese, wedges of cheese, slices of cheese, cut up chicken in a tray, frankfurters, hamburger in a tray, various fresh meat cuts such as pork chops, steaks, pieces of meat as well as whole chickens, ducks, turkeys, geese, whole meat-loaves, smoke butts, whole pieces of sausage such as bologna and liver sausage, whole cooked hams, smoked picnics (shoulder hams) bone-in and boneless smoked hams as well as other similar materials.

Since it is obvious that various changes and modifications may be made in the above description, without departing from the nature or spirit thereof, this invention is not restricted thereto except as set forth in the appended claims.

I claim:

1. An apparatus for use in packaging of an item in an elastic bag whose normal diameter is less than that of said item, which comprises a frame having an opening through which the item is to be passed, a plurality of finger supports, each of said finger supports being pivotally mounted intermediate its ends on a pivot secured to said frame, said pivots being arranged in spaced relationship about said opening, an individual cantilever stretching finger disposed at right angles and secured adjacent the inner end of each finger to provide a passage into which an item passing through said central opening will pass, each of said supports being provided at its outer end with a circular section of an edge cam, a band encircling all the edge cams and secured to each section, and means to rotate said band in either direction.

2. An apparatus as set forth in claim 1 having adjustable means to limit movement of the band in either direction.

3. An apparatus as set forth in claim 1 wherein the band is secured to a slidable connecting rod operatively connected to a piston actuated by a compressed air operated diaphragm.

4. An apparatus as set forth in claim 1 wherein the frame is disposed in an inclined position.

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