United States Patent [19]

Peters

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[45] **Apr. 8, 1975**

[54] **PACKAGE FOR TRANSPORTING AND ROASTING MEAT**

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[52] **U.S. Cl.** **426/113;** 426/129; 426/132; 426/523; 206/521; 206/525; 206/806

[51] **Int. Cl.** **B65b 25/06**

[58] **Field of Search** 426/113, 129, 132, 327, 426/332, 420, 523, 524; 206/497, 521, 525, 526, 806; 62/62; 99/426

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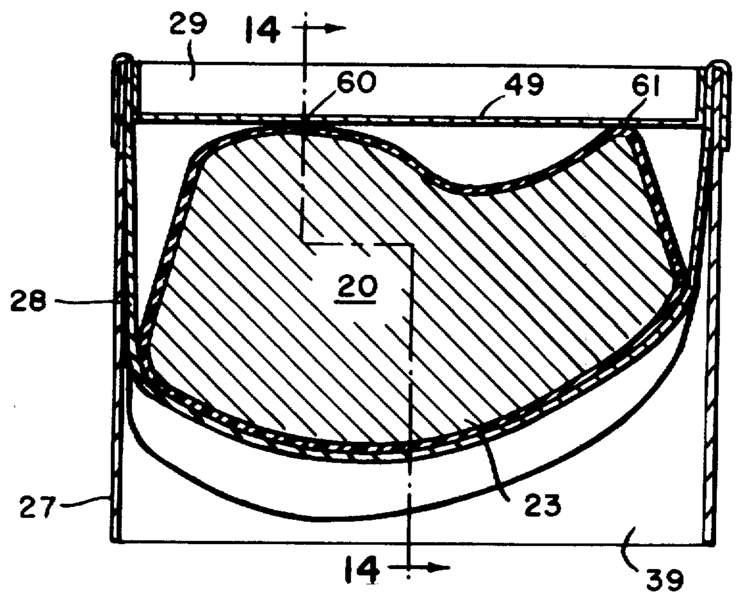
Primary Examiner—Hyman Lord

[57] **ABSTRACT**

A package and method for transporting and roasting meat that holds the meat in its natural shape on a hammock from time of packaging until it has finished roasting; whereby all pressures on and/or within said meat's protein cells are practically eliminated.

7 Claims, 19 Drawing Figures



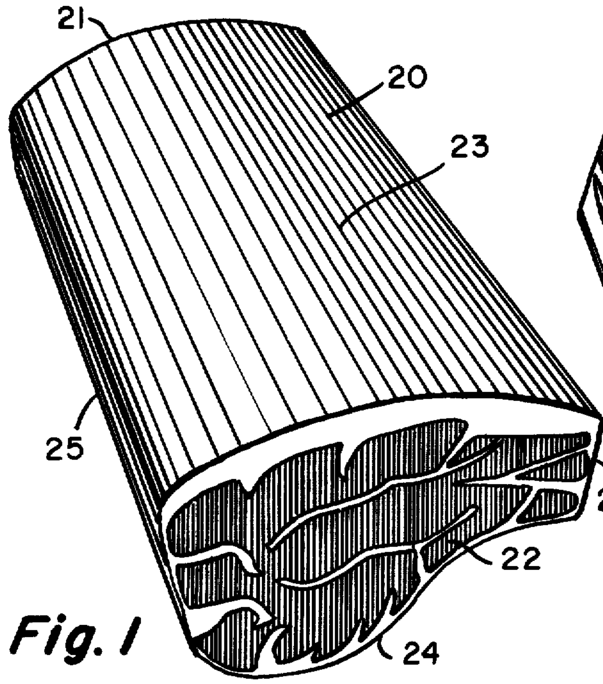


Fig. 1

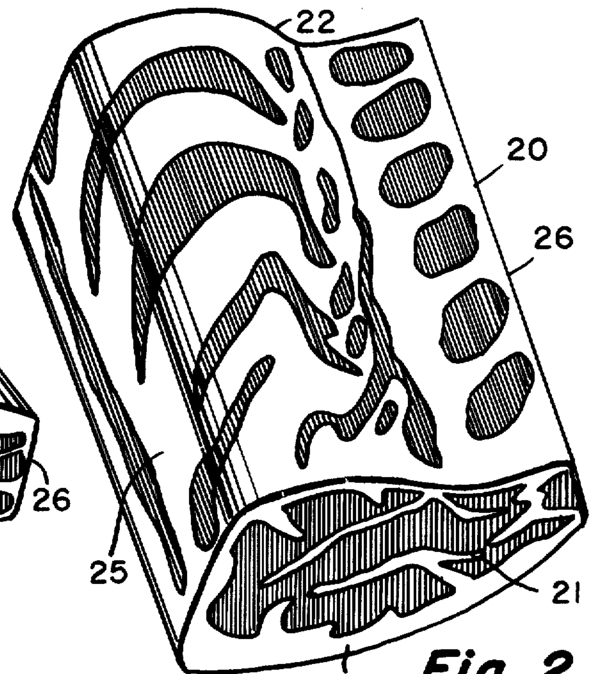
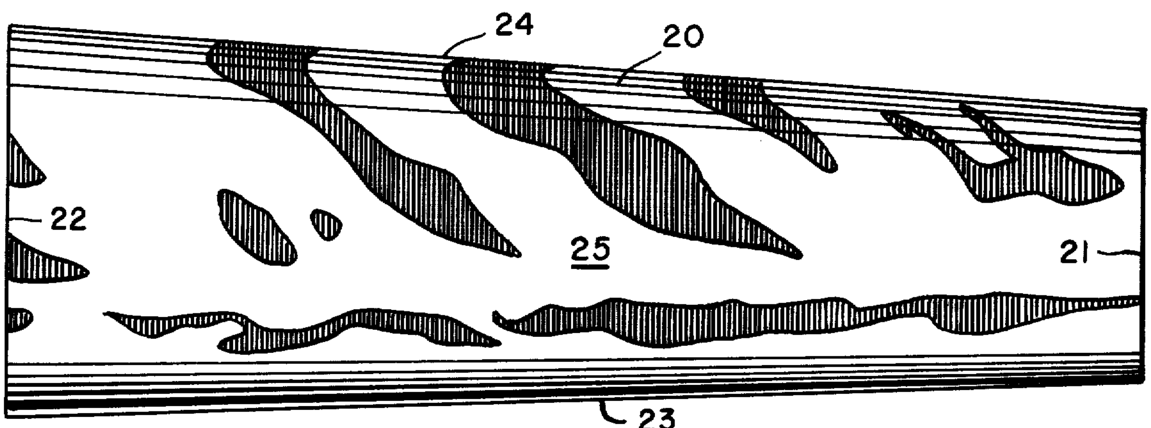


Fig. 2



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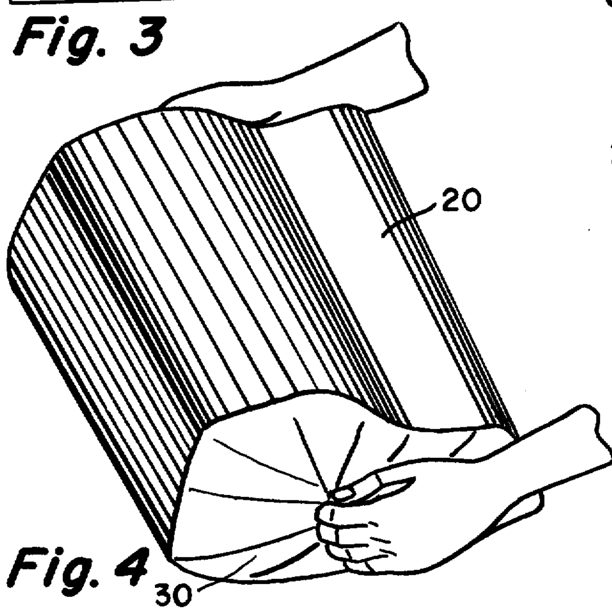

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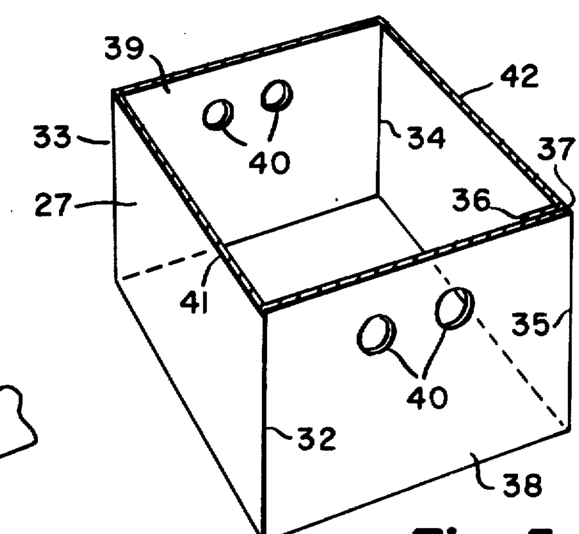

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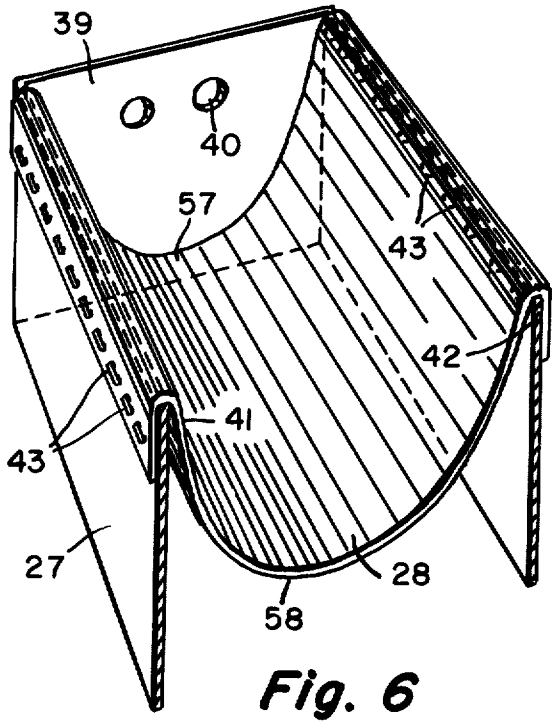

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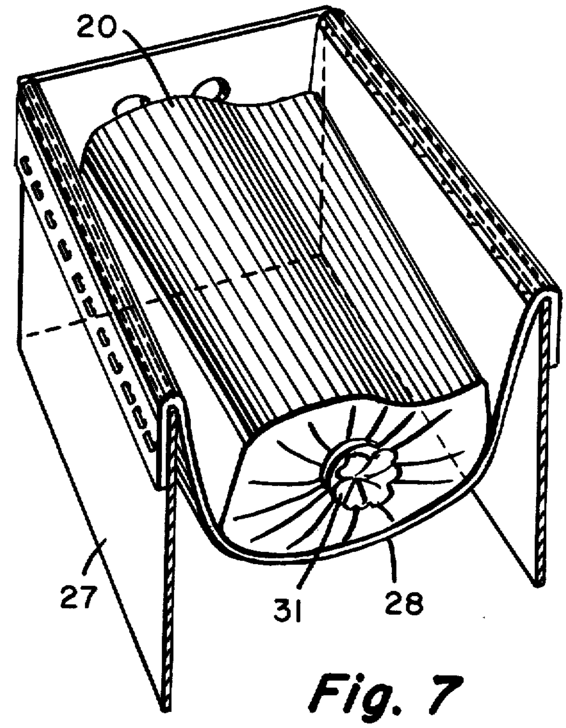

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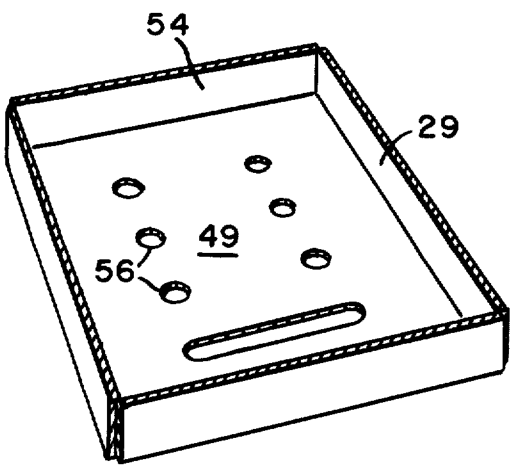

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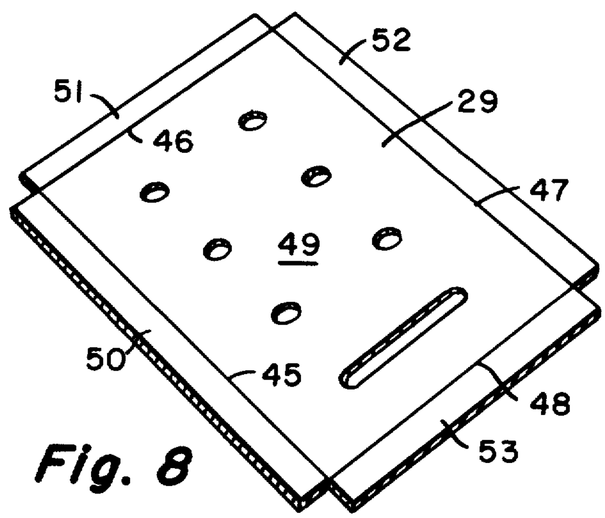

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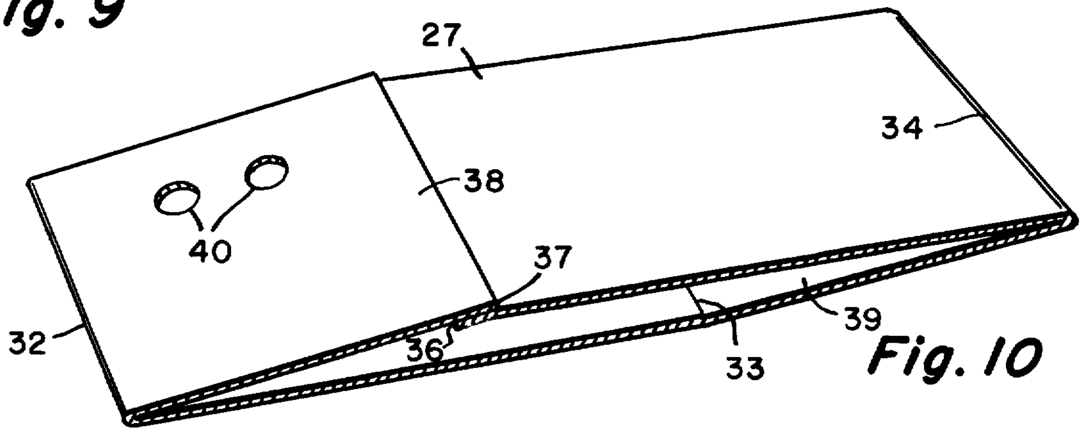

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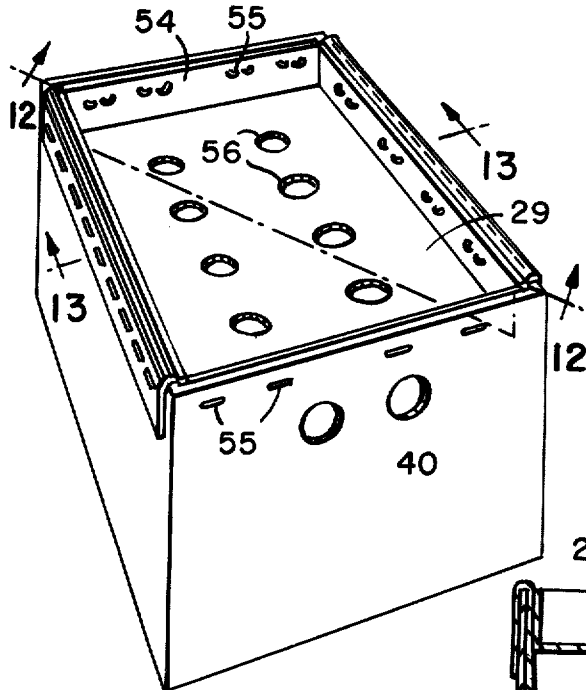

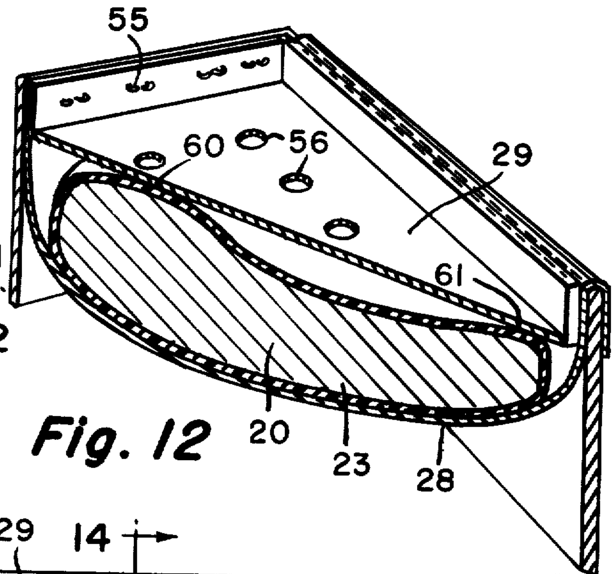

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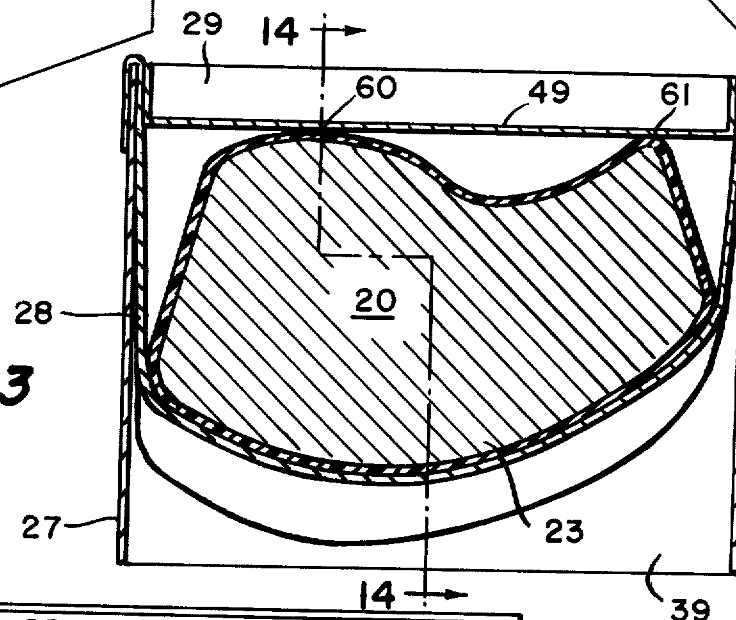
Fig. 11



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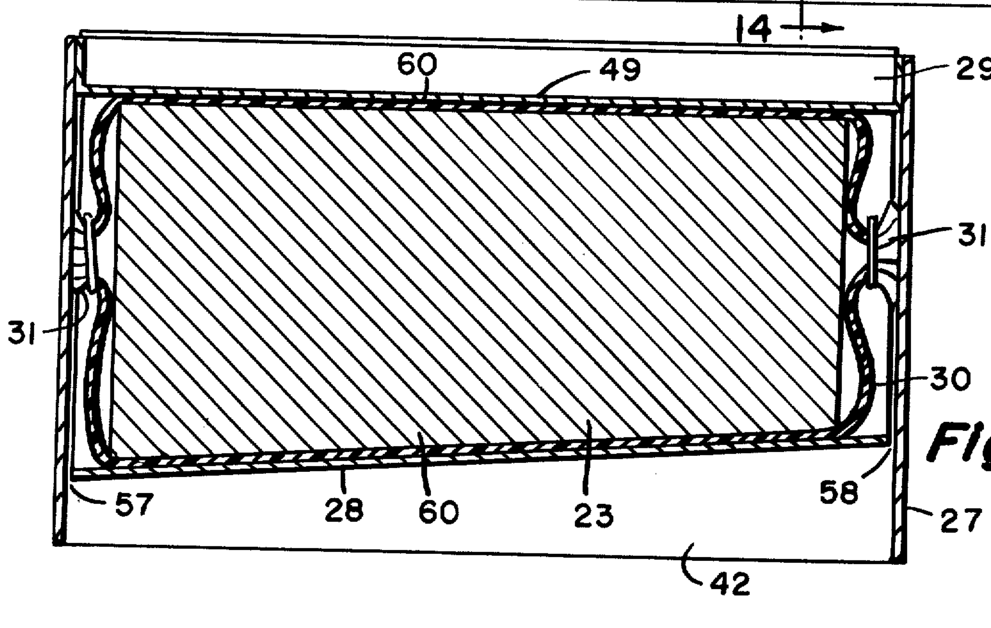

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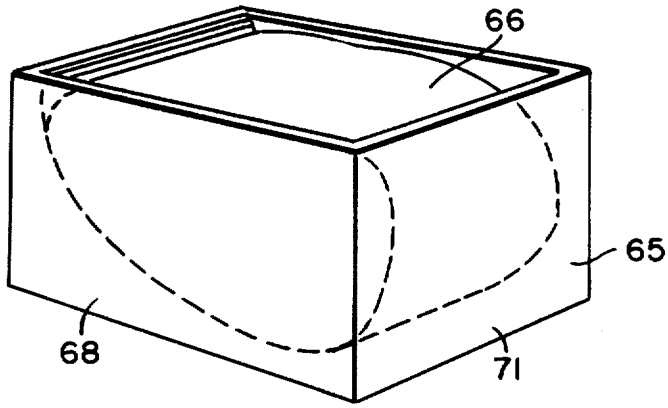

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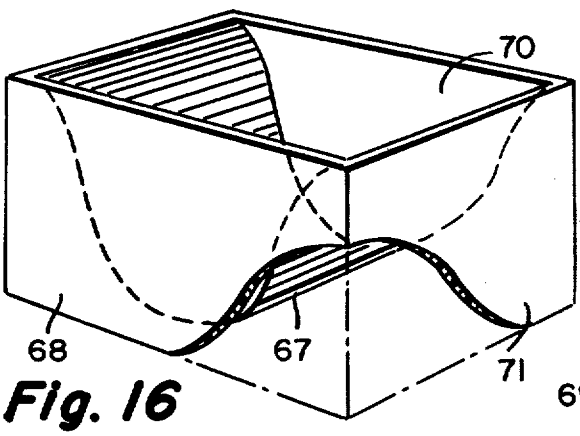

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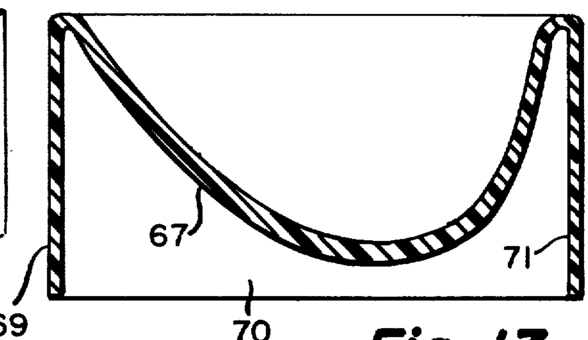
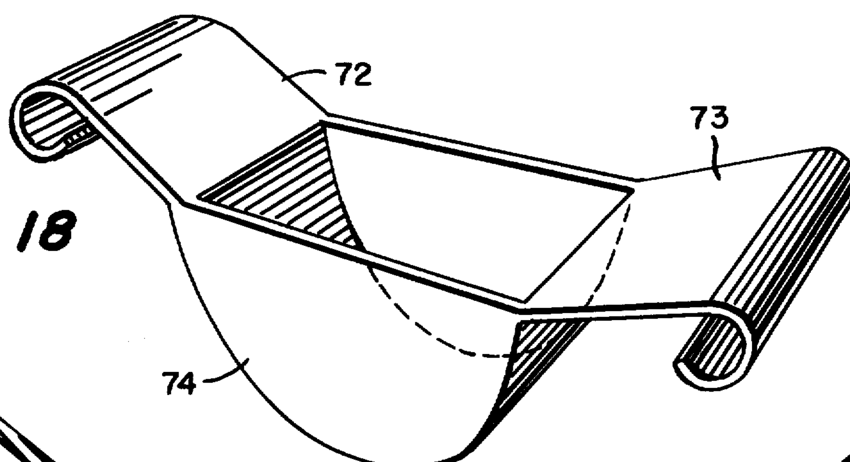


Fig. 17



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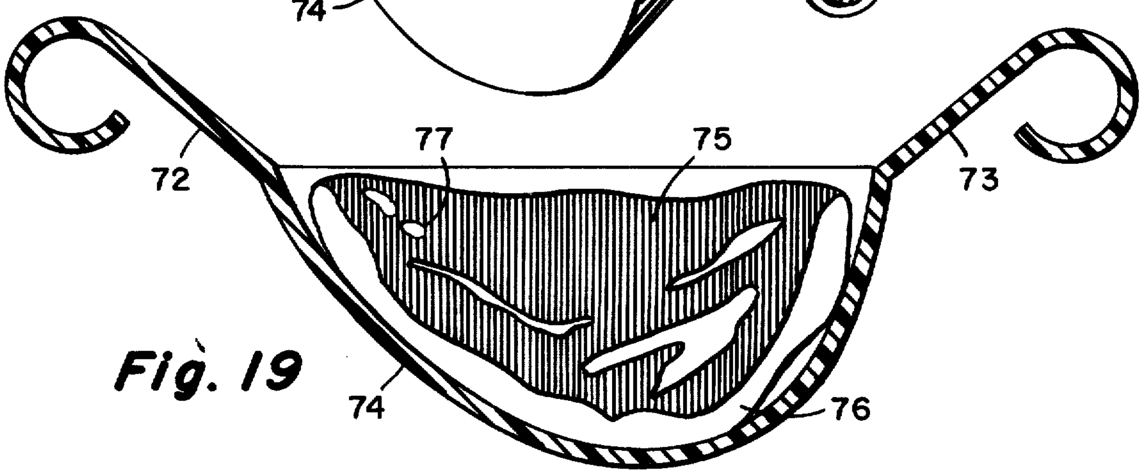

Fig. 19

PACKAGE FOR TRANSPORTING AND ROASTING MEAT

RELATED APPLICATION

This application is a continuation-in-part of my copending applications entitled METHOD AND MEANS FOR PACKAGING AND ROASTING MEAT, Ser. No. 50,374, filed June 29, 1970; and A PACKAGE AND METHOD FOR ROASTING MEAT, Ser. No. 215,620, filed Jan. 5, 1972 now Pat. No. 3,804,965.

BACKGROUND

This invention relates to a package and method for transporting and roasting meats. More particularly, the package provides the meat packer, retail store, the housewife and restraurateur with a method and means tailored specifically to each roasting-type piece of meat purchased, that will reduce the loss of meat juices, increase overall tenderness, improve the "doneness" uniformity of the meat that is roasted to the point that boneless beef ribs can be roasted to a perfect "rareness," literally from outer edge to outer edge.

Many factors, internal and external, influence the finished result of roasted meat. This invention is concerned with certain external factors, individually and collectively, as they affect each other and, in turn, the internal finished result of the roasted meat. It is the general object of this invention to add, modify, alter, and/or eliminate certain external factors so that the finished internal result of the roasted meat is superior to the results obtainable under the present state of the art.

The art is old and extensive on various pans, frames, and racks (external factors) for roasting meats, but none of them singly, or in combination, present a simple, inexpensive, all-inclusive method and means for curing the deficiencies caused by the prior-art factors that are the subject of this invention; factors which have their beginnings at the meat packing plant and continue right on through to the finished roasted result. These prior art deficiencies and their interrelationships, are those which affect loss of meat juices and the uniformity, extent, and rate of heat penetration; both of which, in turn, have a major effect on the uniformity and the accuracy in the degree of doneness, juiciness, and tenderness of the roasted meat.

This invention is applicable only to meats that can be roasted, i.e., meats that are cooked by exposure to radiant dry heat in an oven having heat-reflecting surfaces. This is in distinction to meats that are baked, i.e., cooked by substantially confining the meat in direct contact with the inside of a hot metal vessel, whereby heat is conducted through and by the vessel's walls to the meat inside, so that it is more directly the vessel's heat rather than the oven's heat that does the "cooking".

This invention has particular application to boneless roasts, filets, thick steaks of beef and veal, and carcass (bone-in) turkeys; and of general application for pork, lamb, and whole-carcass poultry such as chickens, ducks, etc.

For purposes of illustration this invention will be described mainly with boneless beef taken from the rib section of beef carcasses. Such sections are commonly referred to as boneless "rib roasts." A beef rib roast, to be finished perfectly and completely "rare", "medium rare" or "medium," is chosen as the exemplary item of this invention because it is the most difficult item of all meat cookery to finish successfully. Until this invention such success has defied the skills of both housewives and restaurateurs.

Standard layman's literature on meat cookery defines the accepted internal qualities of well roasted beef as follows: Color should be even, and its shade match the extent to which it has been roasted; e.g., it should be bright pinky-red for rare, reddish-brown for medium, and greyish-brown for "well-done." All of it should be tender and juicy.

Standard scientific literature on meat cookery indicates how the condition of the meat-protein-cell fibers during roasting affect the general juiciness and tenderness of the finished roast. For example, if the meat-cell fibers are in a relaxed condition (i.e., not contracted from excessive heating, or stretched from pressures due to weight-bearing, or squeezed from being boned, rolled, and tied,) they hold their juices better, and the meat will "cook out" juicier and more tender. The more relaxed the protein-cell fibers, the less the weight (juice) loss, and the juicier and more tender the finished roasted meat.

The Influence Of Heat On Meat Fibers

The roasting temperature, its uniformity, extend and rate of penetration, has a direct and positive effect on the relative relaxation of meat fibers. There are natural collagenase enzymes in beef, which under 140° F. attack and relax (soften and tenderize) the connective cell fibers, which in turn, also helps retain juice within the cells' walls. The higher the temperature over 140° F., the lower the ability of these collagenase enzymes to tendersize the fibers, and the greater the contraction (and hardness and toughness) of the fibers, and the greater the quantity of juices that will be squeezed out of the meat cells.

About 25% of the water (juice) in beef is "free" or "loose," i.e., extra-cellular (outside of the protein fibrous cellular structure proper), and 75% is "bound," "immobilized," or intra-cellular (inside the cell fibers). The "free" water is not free in the sense that it is flowing loosely around inside the body of the meat on the outside of the cells. Rather, it is mechanically immobilized by the network of membranes, filaments, cross-linkages, and electrostatic forces between the cellular chain on the outside of the protein (fibrous) cellular structure proper.

There is a continuous transition from the bound to the free state; a transition that can be remarkably speeded up by the application of very low pressures. Contraction of the cellular fibers, caused by a high-temperature-induced inability of the collagenase enzymes to relax them, will apply such low pressures, and quickly and easily decrease the immobilized water with a corresponding increase in the expressible water. It is quite common under present cookery methods (in the home especially) to lose upwards of 15% of a roast's total weight via such cellular contractions. And it is not uncommon to note examples of the rapidity with which temperature increases can disproportionately increase juice losses. For example, a 40% increase in temperature (from 250° to 350° F.), which is not an unusual difference between various housewives' roasting methods, can step up weight loss over 50% (from 15% to 25%). Thus, meat juices and highly valuable protein foods are lost, and a tougher, drier, meat roast is the result.

Loss of meat juices and toughening (contraction) of meat fibers from overheating, and/or non-uniform heating, are easily observable phenomena in any home or restaurant. For example, the common method of roasting a rib-roast is to place it in an open pan, and/or rack, within an oven. The bottom of the meat rests in direct, weight-pressured, contact with the pan's bottom or the rack's spaced metal surfaces. The meat is normally positioned with the fat side up so fat juices can "seep" downward, allegedly into the protein area. A meat thermometer is pierced into the meat so the tip of its temperature probe is at the center of the meat. The metal pan or rack is always of a relatively heavy non-flexible gauge to support various sizes and weights of meat. Being a better conductor of heat, and having a body of considerably less thickness but greater density, than the meat itself, the body of the metal will more quickly come to, and more constantly stay closer to, the maximum heat of the oven than will the main body of the meat. In addition, the weight of the meat brings its pressure to bear at the points of meat-to-metal contact, which brings into action the wellknown fact that pressured heat cooks food faster than non-pressured heat.

To illustrate:If a 4-lb. rib-roast is to be finished rare, a normal procedure is to roast it for 2 hours (30 minutes per lb.) in a 300° F. oven. The metal pan or rack in which it rests will reach 300° F. in a few minutes, at about the same time as the oven itself, while it will take 2 hours for the meat to reach only 140° at its center. With the metal pan or rack constantly close to the heat of the oven, and with 4 pounds overall pressure being exerted at the bottom of the meat, this means that portions of the roast in direct pressured contact with metal, and adjacent thereto, will be roasting constantly at about 300°.(and with 4-lbs. pressure across the meat-to-metal contact area, the roasting effect on the meat in this area is considerably greater than a 300° temperature alone would produce), while the meat not in metal contact will be roasting at considerably lower temperatures and pressures.

When a meat thermometer shows that such a roast has reached the 140° F. (rare) temperature at its center, and is removed from the oven for serving, two clearly observable evidences of toughness and/or fiber degeneration can be seen:

1. On the outside it will show sear marks (dark brown or black lines and/or areas) where the meat has been seared (i.e., dried out) and/or grossly overcooked (i.e., degenerated to ash) from contact with hot heavy-gauge metal. These sear marks are most visible if the meat is roasted on wire racks, and the sear marks from the wires can be seen in contrast to the meat surfaces that have not contacted the metal.
2. On the inside it will show the following: pinky red and rare at the center where the temperature reached only 140°, and then from center to outside in deepening shades from pink to greyish brown; the latter evidencing both loss of juice and increased toughness due to increasing heats to which the areas closer to the surface are subjected. The net result: obviously not a rare finished roast, in the complete sense of the word.

This non-uniformity of roasting will have been aggravated by the following factors: when an oven's heat cycles on and off in maintaining its thermostat setting, the range of heats may be considerable. They may range from 10° to 30° over and under the average temperature (total top to bottom range of 20° to 60°) depending on the thermostat, the oven's insulation, and the level of heat. About the best one can expect from the average oven is a cycling range around 20° between its high and low points. So, at best, meat that is in contact with metal is roasting at least 20° higher than the meat not in contact with such metal and considerably higher under the influence of pressured heat at the areas of meat-to-metal contact.

All of the roasting accessories used with present-day beef roasting are of relatively heavy non-flexible gauge metal. They will hold temperatures longer and remain constantly closer to the higher temperatures within the cycling range than will the ambient oven heat itself. This, combined with the pressures, results in meat at the meat-to-metal contact points being greatly overcooked compared with the rest of the meat.

In addition to the problems of overcooking, toughening, and de-juicing of the meat adjacent to the metal contact points, the juices which seep and leak out of the roast and collect at the bottom of a metal pan, around the bottom of the roast, serve as a boiling medium, so that in addition to being subject to greater heats and pressures, this area is also subject to being boiled. The combination of these factors produces meat considerably more well-done than in those areas not so subjected.

The phenomena observable when roasting with heavy metal accessories are also observable when roasting a rib roast with the ribs in the meat. The rib bones being of greater density than the meat, they conduct and hold heat somewhat similar to metal, and the resulting roast shows somewhat similar effects; the meat adjacent the bones is always more well-done than the rest of the meat.

Another factor that is inimical to the achievement of complete, uniform, (from skin to skin) doneness for the protein area of roasting beef under present-day methods is the open, unprotected, exposure of the meat's surface to radiating oven heats. This open exposure is particularly harmful during the rapid upsurge of heat during the on-cycle of a thermostat's cycling range. When an oven cycles, it is normal for it to be on-heat only a short time (maybe 10%) and off-heat (maybe 90%) of the time. During the short on-heat period, heat is surging into the oven and, in a few minutes, has pushed the temperature up by 20° to 60° (from its low point to its high point). This rapid upsurge agitates the ambient air within an oven whereby its radiating heat waves have a more penetrating effect than when the temperature is stable or declining. This phenomena takes place scores of time as a thermostat turns on during the roasting time of a beef rib. The effect of this practise and the cycling phenomena is that the surface areas of roasting meat, to depths of major fractions of an inch, are always considerably more toward being well-done than the areas further into the interior.

The net effect of the various kinds and levels of heats affecting roasting meat under present-day methods and means is that it is a practical impossibility to achieve a perfectly uniform doneness (from skin to skin) result in roasting to a finish in the rare to medium classification. It is part of the primary objective which follows to accomplish a perfect doneness result by eliminating the deleterious effects of upsurging temperatures during the on-heat cycle of an oven's thermostat.

During such cycling, and/or during roasting at average temperatures near or above the 212°F. boiling temperature of water, the outside areas of roasting meat are (with present-day methods) directly subjected to the temperatures that produce internal expansions in meat cells. When these temperatures pass the 212°F. level, water changes to steam. Then the expansion is rapid, big, and under such a pounding pressure that meat cell walls cannot confine it; the walls rupture, and the valuable protein juices drain out. But, regardless of the particular temperature at which a housewife or restaurateur desires to roast beef, but especially if they wish to stay at or under the critical doneness temperatures of 140°F. for rare, 150° for medium rare, 160° for medium all the way from center to the outside, it is imperative for good beef-roast cookery that all the factors affecting the final result, but especially both the per se heats and the pressured heats to which the meat is subjected, be carefully controllable and controlled; and the preceding-mentioned undesirable pressure-producing and juice-extracting heats eliminated.

It is a primary object of this invention to do precisely this. To provide a method and means, specifically designed for every individual cut of beef roasted at home or in a restaurant, that will allow a more even and uniformly accurate penetration of cooking heat at whatever level, but especially at the critical 140°, 150°, and 160° heats needed, respectively, for rare, medium rare, and medium results, so that the tenderizing activity of the collagenase enzyms may be more evenly and uniformly controlled throughout every specific roast, so that, in turn, the maximum natural relaxation (i.e., maximum non-contraction:
minimum toughness,-maximum tenderness) of the meat fibers during the roasting process are maintained, which, in turn, prevents loss of water (i.e., juice) and maintains the maximum juiciness of the finished roast.

The Influence of Physically-Produced Pressures On Juice Loss

Loss of meat juices is also caused by pressures from weight-bearing, shocks, squeezings, and bendings whereby the meat-cell fibers become so stretched and distended, so un-relaxed that both the intra-cellular and extra-cellular network of membranes and linkages become distorted and broken, whereby juice is excreted in this manner too. First the free juices leak out, and if the pressure is sufficient and continuous, the cell fibers may also stretch and weaken to the point that bound juices are also released in quantity. The weight-exerted pressures that can produce this loss of juices is of the order of less than one-fourth-lb. per sq. inch, a weight pressure that easily can be produced by an ordinary home-size beef roast from its own weight. It is in this specific area of the elimination of pressures, external and internal, that the most surprising and beneficial results of this invention are obtained.

Loss of meat juices from weight- and/or shock-exerted pressures is a common observable phenomenon. Its evidence is widespread in the blood (meat juice) soaked paper wrappers and/or blood collections in the plastic wrapper trays packaged with meat purchased by housewives. This phenomenon is observable in such retail stores where beef cuts may be too tightly wrapped, tied, and/or piled on top of each other in the meat case. It usually becomes more evident after the meat has been handled, tumbled, crushed, and pressured in the non-refirgerated trip from store to home. It is not uncommon that from 3% to 6% of a rib roast's total juice content is lost in this manner. And more is lost from these causes after the meat enters the oven; i.e., when the previously-caused internal cell-fractures are opened still more under the influence of roasting heats.

This juice loss from weight-produced pressure continues high in the roasting oven because present day roasting accessories and/or methods, fail to provide the best means for distribution of a specific meat-cut's own weight. More often than not meat is positioned and/or supported in a manner that the maximum, rather than the minimum, amount of weight is bearing down on its resting surfaces.

It is in this area of weight-shock-squeeze-and-bending-produced pressures that the shape of a meat roast has never heretofore been given critical consideration. To relieve and/or eliminate any and/or all of these pressures, the retention of the meat's natural shape and the protection of its body against physical abuse must be scrupulously honored. My invention does precisely that for the first time in the hisotry of the commercial meat industry.

For example, until this invention, little or no indepth attention had been given in prior art or practice to the support and maintenance of the natural shape of boneless ribs of beef while they were in transit thru the channels of trade and/or roasting in an oven. At best they might be tied with strings to the rib cage from which they were cut, on the theory that the shape of the rib bones would provide support for the natural shape of beef. However, if the strings were tied tightly they would cut into the meat and bleed it in this way. Or, if the strings were tied loosely, the meat would shift on the bones and the hoped-for support would not be achieved. Still another method would leave the rib meat un-boned, so the ribs would form a rack on which to hold and support the meat while it was transported and roasted bone-side down. But this method provides no support while intransit if it lies bone-side up and/or against other pieces of meat piled on top of it; nor against weight-bearing or heat-produced pressures if it is roasted with the bone-side up (fat-side down).

The best present-day practice for shipping fresh beef ribs (boneless and bone-in) from packing plant to retail store, is to carton them with one or more other sub-primal cuts (chucks, loins, and rounds) of beef, each weighing from 20 to 40 pounds. In transit these cartons are given shock treatments from rough handling that includes dropping, smashing, and many hours of travel in bumping vehicles. Inside the cartons the heavy cuts of meat are pummeled and knocked against each other. The net result is meat whose cell walls have been given severe internal bruises, fractures, and breakages, with resulting leakage of cell juices even though the meat is relatively firm-bodied while under refrigeration. The evidence of leakage is observable at point of destination where pools of blood inside the cartons, and blood soaked carton walls, are a common phenomena. Additional juice loss from this kind of packaging and handling comes when the retail store slices the sub-primal cuts into consumer-size cuts. Leakage from these internal bruises is even worse when the meat loses its firmness in the roasting oven.

Another deleterious present-day practice in purveying boneless ribs of beef is to bone, roll, and tie them. This is supposed to prevent juice loss, and make carving easy. It does make carving easier, but instead of reducing juice loss, it actually increases it. By bending the boneless meat into rolled form and tieing it tightly, the meat is severly distorted out of its natural shape and many of its protein cells are squeezed to the point of bursting even before entering the oven. Then many more cells burst open while being squeezed under the heat of roasting.

The cumulative effect of the various pressures on fresh ribs of beef produced by present-day methods of packaging, transporting, and roasting is juice losses that run well upwards of 15% to as high as 40%. A low average loss, of combined shipping losses and oven losses, is about 20%. With whole U.S. Choice grades of boneless ribs of about 15 lbs. weight priced at the retail level at $2.00 per lb., a 20% (3 pound) juice loss represents a dollar loss of $6.00 per rib. In addition, there are unmeasurable losses in nutrition, flavor, and aesthetic eating values, since juiciness is one of the qualities both consumers and nutrionalists value in roast beef.

It is a major objective of this invention, therefore, to package and roast a fresh boneless rib or beef in a manner that will reduce and/or eliminate juice losses caused from weight, shock, squeezing, bending, and string-cutting pressures on the protein-cellular structures of the meat. It is a corollary objective to package, transport, and roast, fresh boneless ribs of beef in a manner that supports and maintains said beef in its natural shape free from all pressures except that of its own weight. But even in this area of "its own weight" I have discovered a new, non-obvious, unique way of substantially reducing weight-produced pressures caused by the weight of the meat itself on its own protein section alone; the most nutritionally important and most economically valuable portion of a beef roast.

Prior methods for roasting such beef have normally practiced roasting with the fat-side up on the theory that this enabled fat juices to seep downward and penetrate into the protein section, and thus keep both the inside and outside of the protein section from leaking its own juices or drying at the surface during roasting. There is no actual evidence that such fat juices do penetrate into unbroken protein cells and/or prevent protein juices from leaking out of such cells; as a matter of observable fact they do not do this. Therefore, by reversing this prior-art normal practice and turning the fat side down, I have not lost anything. In fact, I have gained much. This gain is achieved by using a preferred embodiment of this invention, i.e., a package structured to hold a hammock (i.e., a couch or bed suspended at its ends, which drapes downward at its middle when a body is supported by it) on which to rest and support a piece of meat in its natural shape. The natural curvatured shape of a rib of beef is convex on the outside (the fat side) and both concave and convex on the inside (the lean rib-bone side). To support a boneless rib of beef, therefore, in its natural shape in a hammock, (a structure that drapes downward) its convex-curved fat side should be down (thus draping downward towards the hammock's middle to maintain the rib's convex shape). Supporting a boneless rib of beef on its dual convex-concave rib-bone side would bend the meat into a slightly unnatural shape, and place a strain on its cellular structure during transportation.

In the preferred embodiment of this invention, therefore, the web of may package hammock supports a boneless rib of beef lying convex side down with a surface-contoured contact on practically five of its six sides, and supports it thus during its entire journey from time of packaging until it has finished roasting in an oven. With such a functioning package I achieve the following objectives, benefits, advantages, and superior results compared with prior-art methods of packaging and transporting meat:

1. Protein juice loss in a whole boneless rib (in the 15 to 20 pound weights), for example, is usually reduced to substantially less then 5%.

The natural outside fat coverings on a boneless rib of beef represents about 20% to 25% of the total weight of such a meat cut (depending on the grade, finish, and trim of the meat). And since this fat is principally layered on and covers one of the cut's two broadest sides it can provide a wide and thick area on which the protein section can rest and cushion its cells. Thus the protein area can rest on a soft pillow-like bed of fat to which it is fiber-bonded on its original natural-body slightly curved convex shape. This, in turn, effects positive-positioned maximum-possible distribution of protein-cell weight, and thus too, minimum-possible pressure of any kind on the valuable (for eating) protein cells. Evidence of such effects is dramatic and positive in the tiny amount of protein-cell juices that are excreted during roasting; an amount in the order of less than about 5% of a boneless roast's total weight. This is an unheard-of accomplishment under any of the prior art methods for roasting beef.

2. Pressured protein areas sealed against juice losses.

Where the protein and fat sections meet (where weight pressure on the protein section is greatest) they are tissuegrown and fiber-locked together so that any propensity on the part of the protein section to excrete juice at this pressured meeting-point area is effectually sealed off and blocked by bonded cells of the fat section.

3. Preserves and protects rareness.

Any juices (protein and/or fat) that are excreted will drain to and collect at the base of the meat around the fat area, away from the protein area, and are thus prevented from contacting and/or overheating any of the protein area, which heated contact would damage some of the desired rareness result of the protein cells.

4. No juice loss at the top of protein area.

The top of the protein side has no weight on it; so no cell distention or breakage, and therefore no juice loss can take place from any weight-produced pressures in this area.

5. Protein area under lowest-possible weight pressure.

It is a coincidental bonus-benefit of this fat-down roasting discovery that the natural dimensions of most of the consumer (non-restaurant) size beef roasts above 2 ½ lbs. of the various-sized boneless rib cuts have their narrowest dimensions (i.e., thickness) running from top to bottom when the fat side is down and their largest non-protein plane area (the fat covering), i.e., its largest per square inch (pressure-reducing) area, on which to rest its bearing weight. Here then is the most beneficial manner of positioning a boneless beef roast to achieve the lowest-possible (practically nil) loss of protein juice, and thus the juiciest possible finished beef roast. It is therefore the preferred method of practicing this invention.

It is another primary object of this invention, therefore, to provide a method and means specifically designed for, tailored to, adapted for, and structured to guarantee fatside down roasting, and part of the package of, every individual meat roast purchased in a retail store that will always reduce to at least the minimum of each specific roast's total weight, and preferrably to the weight of the protein section alone, the amount of per square inch weight (or pressure) on its weight-bearing surfaces at any and all junctures in its journey from the time of packaging through the roasting oven, so that, in turn, the weight-produced pressures on the meat cells (especially the protein cells) in the vicinity of the weight-bearing surfaces will be reduced to a minimum, which, in turn, will reduce juice loss (especially the protein juice) due to pressure to the minimum.

The Desire For Rareness

In addition to tenderness and juiciness, the degree of doneness or rareness, in beef roasts expecially, is of critical concern to any cook. Rib roasts are one of the prized entrees most frequently used for special dinners in home or restaurant. Because of this, all cooks are seriously, even nervously, concerned over the results of their cookery with this item. A housewife expecially has good reasons for being nervous because her results usually fall considerably short of her hopes and expectations; many of them outright failures.

These failures, both in number and extent, generally increase in direct proportion to the degree of rareness she is trying to achieve. If she is seeking to have her roast medium (i.e., midway between rare and well done) or medium rare, she is dealing in degrees of rareness that require tight control over the interrelated factors that influence the desired result. Such control increases in difficulty and criticalness as the desired result goes from well done to medium to medium rare to rare. To achieve a roast that is truly rare (i.e., pinky red) from center to the skin-edged outside, and uniformly so thru the entire body of the roast, is an accomplishment very few, if any, housewives or chefs are able to achieve. Very few of them are even able to control the several external factors that influence an accurate desired internal result.

More often than not in today's home cookery, if the housewife wants a rare rib roast, it will come out "raw" (i.e., substantially uncooked) in the center, rare midway between center and outside, and well-done in various depths along the outside. Or, if it is rare at the center, it will be well-done in varying degrees from midway to outside. This is also true of the restaurateur, but in lesser degree because he has more expert and constant experience with roasting ribs of beef.

The appetite for beef roasted rare has increased markedly in recent years. Today the majority of consumers prefer their rib roasts rare, or at least medium-rare, rather than well-done. This preference has been stimulated by a growing empirical awareness that such meat is more flavorful, more tender and juicier, than most roasted well done.

The cooks who wish their beef rare use the well-known standard temperature guide of 140° F. internal temperature (thermometer-inserted reading) in their attempts to achieve the desired rareness. Both the preferences for rareness and the use of the 140° guideline, have firm bases in the known scientific facts that: (1) at the 140° F. line the natural collagenase enzymes are still within a favorable temperature climate to actively attack the tough fibrous connective tissues, while at the same time roasting the meat so it is on longer raw; while as the temperture rises above 140° these enzymes become less active; and that (2) rare beef is measurably higher in flavor, juice, and tenderness.

The pressure on the juices in beef cells, either from contraction of their fiber walls due to excessive heat (and therefore also from inactivity of the collagenase enzymes) or from distortion of the fibers due to other pressure-producing causes has a direct effect on any cook's ability to obtain the degree and uniformity of rareness desired. To the extent that a beef cut has lost its original juice, to that same extent it has lost its ability to roast-out rare. My objectives of greater tenderness from better heat control and more juiciness from better pressure control therefore also have a direct and related influence on the ability of any cook to achieve a rare beef roast.

It is therefore another primary objective of this invention to supply housewife and restaurateur with a simple, inexpensive, method and means tailored to, and packaged with, every meat roast they buy, that will more accurately and conveniently enable them to produce finished roasts that are more predictably, completely and uniformly rare thru-out the entire inside; from the center to the very skin-edge around the entire periphery of the roast's protein section.

A Universally Adaptable Package For Maximum Tenderness and Juiciness

Prior art presents a prolixity of methods and means (e.g., pans, frames, and racks) that allegedly, but not actually, achieve some of my objectives. For example, there is a large variety of rotisseries designed to keep juices that have been forced to the surface from dropping off the meat and to provide an even penetration of heat. This is allegedly done by keeping the excreted juices flowing in contact with the meat's surface by rotating it on a spit. But, at the same time heat-conducting, and therefore fiber-tightening and juice-extracting prongs pierce far into the interior of the roast, nullifying in large part the sought-for objective of juice retention; an objective that is allegedly obtainable by this method, but is neither empirically nor scientifically provable.

Other devices in the prior art pick up, and pour back on the meat, juices that have already dropped off. There is no evidence to indicate that once the juice has been forced out of contracted and/or broken cells the process can be reversed and the juice forced and held back in. There is no empirical or scientific proof to support the idea that this kind of "basting" results in a net reduction of internal juice loss.

Still other devices are designed simply to keep meat raised up from contact with the bottom of a pan to allow even heat circulation and/or to fit special carcass contours of some meat item; but these do not per se distribute pressure-producing, fiber-stretching weights evenly.

The pans, frames, and racks available for purchase are of such comparatively large sizes and shapes that most housewives do not have kitchen storage space for more than 1 or 2 of them. Also, all are too expensive to be purchased and discarded (like a tin can) with every particular roast she buys. Thus, because the various meat roasts have considerable variety in their shapes, sizes, and weights, and because the very few pans, frames, or racks possessed by the average housewife (or even the average restaurant) fit all the roasts she buys, she is limited in her ability to coordinate the two situations so they could cooperate to minimize weight-produced pressures and maximize meat-cell fiber relaxation, enzyme activity, and juice retention during roasting.

Nor can the average retailer or wholesaler be of much help to correct this lack of coordination and cooperation between what he sells and the apparatuses on which the meat may be roasted. Nature, and the economics involved, limit the sellers in the extent to which they can tailor and reshape roasts to fit the precise pan, frame, or rack in which every particular cook may wish to roast the meat. So the majority of cooks, housewives especially, suffer with what is presently available; both in the meat cuts they can buy, and the roasting accessories they have at hand.

The tremendous quantity of the prior art in the meatroasting-accessory field indicates the deep and widespread concern over; the massive amount of thinking and effort that has gone into; and the need for solutions of the meat-roasting problems of every housewife and restaurateur. Despite this prolixity of the prior art several serious deficiencies common to all remain:

1. None is really an all-purpose accessory capable of distributing pressures from weight-bearing to the best possible advantage for the reduction of juice and collagenase enzyme losses. All are made of relatively heavy-gauge metal, and therefore of rigid construction. They lack the flexibility needed to fit smoothly around each different size and shape of roast. Therefore, the modern cook is really without a direct, simple, universally-applicable, perfect-fitting device for all roast-meat contours and shapes that will provide the maximum weight-distributing function for reducing to the minimum the fiber-stretching and juice and enzyme losses due to pressure from weight.
2. None of it is capable of functioning as a good relaxer of meat fibers so that the natural tenderizing activity of beef's collagenase enzymes may be more evenly and uniformly controlled so that, in turn, there is improved control over both tenderness and juiciness. As a matter of fact, because all present-day accessories on which roasts must rest their weight are made of metal that is relatively heavy, dense, and rigid, and because all of them in varying degrees are in direct pressured and/or meat-pierced contact with their roasting meats, they do just the opposite. The metal used in all the prior art has heat-exchanging and heat-retention properties that promote, rather than retard, searing and over-roasting of meat at its points of contact with roasting meat; that retard, rather than promote the natural tenderizing activites of the collagenase enzymes. So the greater the area of metal-to-meat contact and pressures in the prior art field, the greater the difficulty in controlling the uniformity of the roast. Metal surfaces act as heat exchangers; transferring low temperature heats out of, and high temperature heats into, the meat, both in intensity and continuity. Heavy guage metal, in its entire body, is always closer, more instantly and continuously so, to the highest heat of the oven's heat-cycling range than is the body of the meat. Therefore, these higher heats and greater pressures in the areas of meat adjacent to the metal-to-meat contacts produce meat that is always more well done and over-roasted than it is in the main body of the meat.
3. None of it is sufficiently inexpensive to be purchasable and disposable with every roast the housewife or restaurateur buys. Therefore it is all economically and commercially impractical for packaging with, and tailoring to fit, the design need of every cut and/or carcass of meat.

Thus, on the one hand (1) when consumers purchase meat for roasting, they are confronted with a wide range of sizes, shapes, and weights, while on the other hand (2) they are confined within narrow limitations on the sizes, shapes, structural and metal make-up of the pans, frames, and/or rack accessories they possess on which to roast their meat, so that (3) very few of the roasts they buy will fit into and/or by accommodated by their cooking accessories in the best possible heat-distributing, fiber-relaxing, pressure-relieving, juice-enzyme-retaining manner.

It is a further objective of this invention to eliminate these immediately preceding prior art defieiencies. While my invention offers a simple solution to the various preceding problems of roasting beef to a perfect rareness, the solution was not at all obvious. Considerable time and experimentation was involved before the simple (and thus the commercially-practical) solution made its appearance. The tremendous quantity of the prior art, with its continuing deficiencies and failures in offering real solutions, further attests to the non-obviousness of my simple answers to the problem.

It is a further primary objective, therefore to provide both the housewife and the restauranteur with an inexpensive, oven-rack or frame-suspendable, hammock-like, universally adaptable, low-density, non-heat-retaining, web of material on, and/or in, which their meat can rest while roasting, which is tailored to and/or flexes to the shape and size of, each individual piece of meat, and is, or can be, an integral or accessory part of the package of, every roast they buy, and which will function to promote the natural tenderizing activity of the collagenase enzymes and to the best advantage of the objectives of this invention.

The interrelationship fo the various internal and external factors bearing on a successful roasting result, and the overall combined objective of the individual objectives may be summarized as follows:

A package for transporting and roasting meat that is:

1. Specifically adaptable to, designed to fit, and economically feasible for providing natural meat-shape support for, each individual item in a wide range of weights, sizes, and shapes of various meat roasts, and which
2. will universally and substantially improve the predictability of roasting results, especially in terms of rareness for beef, and which will also substantially improve relaxation of meat fibers caused by either
3. heat or
4. pressure, and thus
5. improve fiber tenderness and reduce loss of meat juices accumulated from the time of packaging through the time of roasting, and do so
6. with a package structure especially designed for roasting beef with the fat side down.

None of the prior art in the meat-roasting field, either singly or in combination discloses such a packaging method and/or means. None of it (1) is specifically designed to fit, and/or is commercially feasible for packaging with, each individual item in the wide range of weights, sizes and shapes of various meat roasts, and which (2) will universally and substantially improve the predictability of the roasting results, especially in terms of rareness, and which will also substantially improve relaxation of meat fibers caused by either (3) heat or (4) various pressures, and thus (5) improve fiber tenderness and reduce loss of meat juices accumulated from time of packaging through time of roasting, and (6) do so in the preferred fat-side down embodiment of this invention. It becomes, therefore, the overall primary objective of this invention to achieve all the objectives as they are embodied in the six preceding interrelated considerations which bear on a successful roasting result.

The five major objectives of this invention are designed to produces, and do accomplish, the following ten detailed functional, and interrelated advantages over the prior art:

1. A method and means for packaging and/or roasting a boneless or carcass (bone in) piece of meat that is universally applicable and individually adaptable to the wide variety of weights, sizes, and shapes found among the meats and poultry that are the subject of this invention, that
2. is sufficiently low-cost so it will be commercially purchased and accepted as a disposable, expendable item that
3. can be tailored to conform to the natural contour of and provide a protective weight-bearing housing, and/or surface protector for, every individual piece of meat with which it is sold, so that it becomes an integral part and/or accompaniment of a retail package, and
4. is structured, so that at the time of roasting its function will change from one of a protective packaging role to a supportive roasting role best suited to hold the roast in a position that
5. will suspend the roast in, and/or on, a cool-to-human-touch, hammock-like web that is molded to conform to, or that can be flexed and moved to conform to, and enfold, the contacted surfaces of the roast, so that it
6. contacts a maximum amount of the roast's surface so that, in turn, a maximum amount of a beef roast's protein weight is distributed across a maximum amount of weight-bearing surface (preferably across the soft fat covering to which it may be naturally attached) and
7. permits the roast to be positioned so that with boneless meat the narrowest overall dimension can be in perpendicular (least amount of weight bearing) and/or fat-down relationship to the base of the enfolding, supporting, web platform, hammock, or sling, so that (5), (6), and (7) working and cooperating together result in a minimum of weight-producing pressures that otherwise would act to press out the protein juice in the area where weight-bearing is greatest, and
8. separates and/or isolates the roasting meat from any contact, direct or through the web, with any material that has a per-square-measure-weight greater than the surface-weight resistance of meat juices and/or has better heat-retention properties than the meat itself and/or is hotter to the human touch than is the ambient heat within the oven, and
9. insulates the surfaces of the meat against the especially penetrating heat waves generated during the on-heat cycle of an oven's heat-cycling-range, and
10. provides a package structure that is "foolproof" for producing a roasted beef rib roast that is uniformly done through-out from outer edge to outer edge in the three difficult finishes of rare, medium rare, and medium.

DESCRIPTION OF THE DRAWINGS

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective longitudinal view of a boneless rib of beef looking from its large end, lying with its outer-carcass side (fat side) up;

FIG. 2 is a perspective longitudinal view of the boneless rib of beef looking from its small end, lying with its inner-carcass side (rib-cage side) up;

FIG. 3 is a longitudinal elevational view of the backbone carcass side (thick side) showing the taper from the large end to the small end;

FIG. 4 is a perspective view of the boneless rib of beef encased in a wrapper and being held and lifted by hands grasping the twisted ends of the wrapper;

FIG. 5 is a perspective view of a corrugated paperboard sleeve, or frame, with finger-lifting holes on two sides;

FIG. 6 is a perspective of the sleeve of FIG. 5 with an end panel cut away to show a web fastened to, and draping down from, two upper edges to form a hammock within sleeve;

FIG. 7 is a perspective view of the hammock of FIG. 6 showing the wrapped rib of FIG. 4 lying fat-side down in its natural carcass shape on the hammock;

FIG. 8 is a perspective view of a scored and perforated piece of corrugated paperboard which is the top enclosure member of my package;

FIG. 9 shows the enclosure member of FIG. 8 folded along its scored and perforated lines to form upstanding peripheral flanges;

FIG. 10 is a perspective view of the sleeve in "knocked-down" folded condition for shipment from a paper-board plant to a meat packaging plant;

FIG. 11 is a perspective view of the closed package showing the sleeve, the outside, fastened, overlapped portion of the hammock and the top enclosure member inserted into the sleeve and within the hammock;

FIG. 12 is a diagonal sectional view of FIG. 11 taken along line 12-12 showing a boneless rib of beef resting in its natural shape fat-side down on the hammock;

FIG. 13 is a transverse sectional view of FIG. 11 taken along the line 13—13 showing the boneless rib of beef resting in its natural shape fat-side down on the hammock;

FIG. 14 is a longitudinal sectional view taken along the line 14—14 showing the boneless rib resting with its fat-side down at an angle from the bottom of the package to compensate for its having a large end and a small end;

FIG. 15 is a perspective view of another embodiment of a package formed in accordance with the invention;

FIG. 16 is a view similar to FIG. 15 with the beef roast removed and a portion of the package broken away;

FIG. 17 is a longitudinal sectional view of the package of FIGS. 15 and 16;

FIG. 18 is a perspective view of still another embodiment of my package; and

FIG. 19 is a longitudianl sectional view of the package of FIG. 18 showing a beef roast resting therein.

DESCRIPTION OF SPECIFIC EMBODIMENTS

FIGS. 1 thru 3 show the shape and peculiar conformation of a boneless rib 20 of beef. Lengthwise it has a small end 21 and a large end 22, which are the only two sides that lie in substantially parallel planes. The long fat side 23 is shaped in a uniform convex curve; while its opposite (protein) side 24 is shaped part concave and part convex. The remaining two sides, the thick (back-bone) side 25 of the rib is angled in a different plane than its opposite narrower (flank) side 26.

Thus, for packaging purposes, it is a complex-surfaced object for which to provide a compact, natural-shaped, protecting, pressure-withstanding, package structure that must function in two different environments; namely, under refrigeration and severe handling during transportation, and at rest against hot metal surfaces during roasting in an oven. Each of these environments subject the meat to their own perculiar pressure-producing factors. Normally, during transportation meat is subjected to numerous outside pressures from shocks, weights, and distortions of its body; then, during roasting, to excessive heats within the cycling range of the oven's thermostat, and from contacts with hot metal surfaces in the oven.

As will be evident from the following drawings and explanation, this uniquely complex meat object with its peculiar, changing, and damaging environmental exposures is packaged in a unique and novel manner that provides the various protections needed to guard its protein cells against loss of their juices.

FIGS. 4 thru 10 illustrate the four essential parts of my preferred package. The sleeve or frame 27, the web or hammock 28, the contents or boneless rib of beef 20, a top or closure 29, and, optionally, a wrapper 30. These parts are used to create an exemplary structure of my invention to transport and roast a piece of meat whereby the advantageous objectives of my invention are achieved. The frame 27 holds the hammock 28 within which the meat 20 is cradled in its natural shape, and the top 29 assists in supporting and maintaining the meat-holding hammock in a looped shape that conforms to the natural shape of the meat it holds while holding the ends of the hammock rigid and firm where it is attached to the frame.

FIG. 4 is a perspective view of a boneless beef rib wrapped in a plastic film 30, which is twisted at each end to provide handles 31 (FIGS. 7 and 14) for lifting the meat into and out of its package. This wrapper film is an optional feature which is in no way essential for the successful performance of my package, during either shipment or roasting. It simply assists in confining what little juice is excreted.

FIG. 5 is a perspective view of the sleeve or frame 27 that forms the support on which, and to which, the hammock portion 28 of my package is attached. The frame is preferably made from ordinary corrugated paperboard (for maximum paper strength at lowest paper cost) having sufficient compression strength to withstand, without breaking or crushing, the weight of the meat and any weights and/or shocks received by it during transportation from packing plant to the consumer. When using corrugated paperboard I prefer to have the flutes or corrugations extend vertically to achieve maximum weight-bearing strength with the minimum amount of paper.

My frame may be structured from any material which has a low cost and high weight-bearing ability in relation to the particular piece of meat to be packaged. Such a frame is made in size and shape to conform to individual sizes, shapes, and weights of meat cuts. It is formed and shaped to function both as a sling-like or hammock-like support for my webbing during the roasting process, as well as a protective-housing for the meat against outside bearing weights while the meat is in transit from the packaging plant to the consumer's home.

The particular frame illustrated is formed from a single sheet of corrugated paperboard which is provided with four fold lines 32, 33, 34, and 35. The ends 36 and 37 overlap and are suitably secured by adhesive, staples, or the like. The frame is shown in a knocked-down or flattened condition for storing or shipping in FIG. 9, the sheet being reversely folded on fold lines 32 and 34. In use the frame is opened to the rectangular configuration shown in FIG. 5 in which the four walls extend perpendicularly to each other. The end panels 38 and 39 may be provided with punched finger openings 40 to facilitate lifting.

FIG. 6 is a perspective view of the frame with one end cut away to show the hammock 28 draped (or looped) within the frame and fastened to the frame's upper long-side edges 41 and 42 with staples 43.

The hammock web 28 is sufficiently non-heat absorbent and/or sufficiently fast in heat-radiation, convection, and/or conduction that it is not hot to the human touch regardless of the temperature at which the meat is roasting. The human hand should be able to touch and/or hold my webbing without being burned or feeling pain. My web is generally so thin, and/or non-heat-retaining, that only fine thermocouple instrumentation could measure its temperature. Since this is neither available nor practical for a housewife or a restaurateur to use, I prefer to use human body heat as a temperature indicator for the desired non-heat-retaining function of my webbing. This low heat-retention quality of my webbing is necessary to prevent over-roasting (overheating) of the kind that is now present with the heavy-weight metal accessories used with the prior art's meat cookery.

In addition to the necessary low-heat retention quality, my webbing should be of a material that is formable to accommodate itself to the shape of the meat it is required to hold. If it is flexible, as illustrated in these drawings, it will function like a hammock by draping and conforming itself to the resting surfaces of the meat it is holding. If it is non-flexible, I use a thermoplastic sheet and pre-mold it to conform, as in FIGS. 15–19, to the natural shape of the meat it is required to hold. It then functions more like a cradle in which the resting body is held snugly fitted on all five of its resting sides. The packages of FIGS. 15–19 will be explained in detail hereinafter.

Such materials as high-heat-resistant, non-heat-retaining, and/or flame-retardant cloth fabrics, glass fibers, reinforced papers, thermoplastic films and/or sheets in gauges within the range of 0.001 inch to 0.007 inch for flexible materials, and 0.007 inch to 0.03 inch for thermoplastic sheets, are all candidates for the webbing of my invention. The particular hammock web **28** illustrated in the drawing is a sheet of glass-fiber-reinforced laminated paper. The reason for such thin webs not feeling hot is known to those skilled in the art to relate to the thickness, specific gravity, and specific heat of the web compared to the thickness, specific gravity, and specific heat of human body skin. That is, the comparative masses and specific heats of the web and skin are such that the temperature change in the skin will be relatively minor compared to the temperature change in the web when the web is touched.

The web illustrated here, and seen best in FIGS. **6** and **7** is seen to hook over the two upper edges **41** and **42** of the frame, and it may be secured by adhesive, staples, stitching, or the like, in order to be fastened and suspended in true hammock-like fashion. As illustrated here, the web is secured to the frame by staples **43.**

Optionally, if the web is preformed from a plastic sheet, as in FIGS. **18** and **19**, its ends may be formed in the shape of hooks whereby it is hooked over the upper edges of the frame and held in place by the weight of the meat pressing downward. Optionally, too, the hammock may be formed from polystyrene foam, cut or molded to form a cavity in which the meat may lie in its natural shape.

My web may also be hung from, and secured to, all four upper edges of the frame. This is particularly desirable for packaging turkeys with the breast side down. When hung in this manner, the web, with its frame support, functions more like a cradle, than like a hammock, in which shape conforming support is given to the turkey body on all of its multiple (peculiarly shaped), natural resting sides.

FIG. **7** is a view similar to FIG. **6** showing a wrapped boneless rib of beef **20** lying in its natural-shape fat-side down on the hammock **28.** The frame **27** and the web **28,** in fastened-together combination, cooperate to form an effective hammock on which to rest the meat and hold it suspended in its natural shape during transportation and roasting, thereby protecting it against both internally and externally produced pressures that break its protein cells and leak, and bleed out, its protein juices. In this protective-housing role my frame-supported hammock has dimensions which circumscribe and encompass the general overall cubic dimensions of the meat it is protecting, and suspends the meat away from any pressured contact (except for that of its own weight) with sides of the frame so that:

1. During transportation, it is the frame, and not the meat, that will absorb any outside weight-bearing and/or shock produced pressures, and
2. during roasting, the meat is suspended, elevated, and spaced apart, and away, from whatever base on which the package rests within the oven; and does so at a distance that provides adequate insurance that sufficient ambient heat separates the hammock-held meat away from any high-heat-retaining metal surfaces that otherwise, from close proximity and/or contact would over-cook the roasting meat. (Note the clearance in FIGS. **6, 7, 12, 13** and **14** between the bottom of the hammock and the bottom of the frame.)

The top **29** of the package is shown in FIGS. **8** and **9.** The top may be formed from a sheet of the same material which is used to form the frame and is provided with fold lines **45, 46, 47** and **48** which define a rectangular control panel **49** and edge panels **50, 51** and **52** and **53.** The top may be stored and shipped in the flattened condition shown in FIG. **8,** and when the top is to be used, the edge panels are folded upwardly to form the upstanding peripheral flange **54.** The top is sized so that it is snugly received by the frame when the edge panels are folded upwardly, and the top may be pressed into the open top of the frame until the upper edge of the peripheral flange is even with the upper edge of the frame. The top can then be quickly and easily secured to the frame by staples **55** (FIG. **11**) which extend through the flange **54** and the walls of the frame.

FIG. **11** is a perspective view of the outside of my completed package showing the top member recessed and secured in place by end and side staples **55,** whereby the frame is rendered rigid and held squared and non-collapsible. This is the completed package for both shipping and roasting. Note that the bottom is open (illustrated in FIGS. **6** and **7**); that the top has several holes **56**; and that the hammock web is fastened to the frame at only two ends, while its sides **57** and **58** at the ends of the meat (see FIG. **14**) are free from the frame. Thus ambient oven heat can circulate up and down thru the roasting package. This circulation can be increased, if needed, by using a porous fabric for the material of my hammock web. This is desirable when all four sides of the web are fastened to the frame; as in the case of a cradle effect for the roasting of turkeys breast-side down.

With this kind of functional construction for roasting within an oven, I have discovered a surprising way in which the original package in which meat is transported may also enter the oven, without any alteration or handling of the meat by the final consumer.

The precise manner in which the roast is resting during roasting is also influential for protein-juice retention. The curvature of the bones of a beef rib-roast determines the inside and outside shape of the piece of meat. When the ribs are removed, the surface of the rib-side (protein-inside side) loses its definitive surface shape, but the fat-covered outside (and most of the protein inside which is attached to it) will remain substantially intact with its original curvature so long as the meat remains chilled and is not bent or rolled and tied. The connecting tissues between the fat and protein sections will thus remain substantially undisturbed; they have not been stretched or strained to the point of tearing or breaking. However, when the meat loses its chill and firmness by heating, and its original curvatured shape is not retained, the connective tissues between protein and fat sections are stretched, strained, and may even be torn. At any rate, this condition is not conducive to the best retention of protein juices.

With my preferred hammock-like package, however, the packaged roasting meat rests in a fat-side down position substantially the same as its natural curvature before boning out the ribs. Even though roasting temperatures render its body limp, my preferred package cradles, positions, and supports the meat during roasting so that there is no pulling stress or strain on the connective tissues between the fat and protein sections or within the protein section itself. Therefore, all protein-cell fibers, though structurally relaxed during roasting, are maintained in substantially their original structural shape by the hammock-like curvature support provided by my package.

Also, in my preferred roasting package the protein area of the meat is protected against the penetrating juice-expanding (and, therefore, cell-wall-breaking) high heats generated during the on-cycle of an oven's thermostat. At the exposed bottom of the package, the protein is shielded from these upsurging penetrating heat waves by the fat layer on which it rests. At the sides and top of the package, the protein is shielded from these heats by a barrier of paperboard walls that insulate the meat from their direct impact.

FIGS. **12** and **13** show the full hammock effect of the package structure with web **28** fastened to and hung from the upper edges **41** and **42** of the frame **27**, and hanging free within the frame with the boneless rib resting thereon in perfect natural shape and conformation, with the symmetrical curvature of the fat-side **23** resting on the hammock which is the bottom (and natural shipping position) of the package. It will be noted that the top of the meat with its dual shaped (both concave and convex) surface **24** is in contact at two points **60** and **61** with the top member **29** so that in the event the package is turned upside down during transportation it will rest on a substantial part of the meat's top surface. In addition, the meat is so confined between the six sides that regardless of which side it rests on, it is held in a relatively compact condition. However, resting in fat-side down position is the ideal condition under which the meat should be transported, and strongly worded copy on the package will normally assure that this is the position that will be maintained in shipment. Other fragile food items such as eggs and glass bottles are now normally handled in transportation with their proper sides up, and my package will be similarly transported.

By resting the meat fat-side down, the following advantages are obtained:

1. The fat provides a cushion for the protein part of the meat;
2. The protein cells bear the absolute minimum amount of weight pressure: only its own weight;
3. The maximum uniformly-shaped surface area is provided across which to spread the total weight of the meat;
4. The only naturally-shaped side is used to provide the simplest and cheapest package construction with which to support the meat in its natural shape;
5. By a fortunate happenstance it is a shape that forms a natural cooperative mating with the shape of a hammock when the latter supports an object.

A hammock flexes into a concave (inside) shape when an object is placed within it. The natural shape of the fat-side of a beef rib being convex, we have a perfect mating and matching of shapes between the convex meat and the concave hammock. Like a real-like hammock which can be tightened or loosened to provide a relatively level or curved angle in which the occupant can lie, my meat-holding hammock-package may also be structured to give the meat whatever supporting angle is best suited to its natural curvature. This is accomplished by fastening the ends of my hammock-web to provide a looping angle best suited to the shape of the meat it must hold. Additionally, I can also give my hammock a side tilt to accomodate (e.g., in the case of a rib of beef) both a tapered shape in addition to a curved shape in a single piece of meat.

FIG. **14** illustrates the manner in which the hammock is tilted from side to side to accommodate the tapered length of the boneless rib, so that the meat rests firmly within the package regardless of whether it is fat side up or fat side down. It will be noted that the bottom of the hammock holds the meat at an angle to the horizontal sufficient to compensate for the tapered length of the meat so that the top of the meat lies in a horizontal plane and in proximate contact with the package cover **29.** Thus both the top and the bottom (protein side and fat side) of the length dimension of the meat is in direct surface-bearing contact along the length of the package's internal structures, and thus, in turn, the meat is supported across the largest weight-bearing surface areas whether the package is transported right side up or upside down.

It will be understood that the angle of support furnished by the hammock and the top may be reversed so that the bottom of the hammock lies in the horizontal plane, and the top of the package is inserted and secured at an angle to the horizontal sufficient to provide the necessary compensation for good weight and bearing support needed for the tapered shape of the meat.

FIGS. **15–17** illustrate a container **65** which is molded from relatively rigid plastic and which supports a boneless rib **66.** This embodiment of my invention serves the double function of providing (1) a perfect individually-fitted, form-fitting cradle or web **67** (for maximum weight distribution) in which the roast is nested, and (2) a structure with extensions forming flat sides **68, 69, 70,** and **71** which serve as peripheral legs on which the cradle with its nesting roast can rest while enroute through channels of distribution and in the oven while roasting. These sides extend downwardly about 1-inch beyond the lowest point of the cradle portion of the package so that the cradle portion is well elevated out of contact with any metal surface in the oven on which it may be standing.

FIGS. **18** and **19** show an adaptation of the package of FIG. **15** with two of the side legs **68** and **70** removed and the end legs **72** and **73** modified to serve as hooks for hanging the meat-containing cradle portion **74** from the underside of an oven's rack. The relatively rigid legs **72** and **73,** are molded into the hooked shape illustrated so that the hooked ends will not straighten out under the weight of the package, and the roast **75** is supported with its fat side **76** down and it protein side **77** up.

It will be understood that the packages of FIGS. **15** and **19** can also be provided with a cover above the meat.

It will also be understood that the packaging of a boneless rib of beef herein is used as an exemplary illustration for the objectives of my invention; the same objectives being achievable by alterations in the structure of the package to accomodate other particular shapes and sizes of other meats. Thus too, for this purpose, the drawings and descriptions in my aforesaid applications, Ser. Nos. 50,374 and 215,620 should be considered as illustrative of the scope of this invention.

It is therefore an additional specific objective to provide a package structure that roasts a boneless rib of beef within a meat-suspending hammock-like package that substantially retains and maintains the original contour of the roast and assures that the meat itself is lying in a fat-down, normally contoured, position.

Such cradling, contour-accommodating, curvature-supporting, of meat like a boneless rib of beef that lacks self-support for its shape once its supporting bony structure is removed also has applicability for meat and poultry items in which the bone structure remains intact during roasting, but which is structured in such a way that it does not provide its own needed support.

From the foregoing, it would seem that my invention has several surprising aspects:

1. Its utter simplicity in performing several diverse and heretofore complicated functions, while remaining extremely low in cost.
2. Its ability to perform these functions, and thus produce the long-sought-for beneficial result of a perfectly rare beef rib roast, in a manner that is uniquely new and different within a field of patented art that is voluminous.
3. A dual-purpose package structure that during the marketing phase of its functional life serves both as a protective enclosure for a piece of meat against any outside force to which it might be subjected, and as a hammock or sling supporting and suspending the meat in its natural shape, and in a maximum weight-distributing manner against internally-produced pressures. Then when it enters the roasting oven it continues to perform these same dual-purpose functions, plus keeping the meat free from any contact with surfaces too hot for human hand to touch. Thus, a package structure for achieving the sought-for advantages during the marketing phase is also the same structure that achieves the sought-for advantages during the roasting phase.
4. In its preferred embodiment, one package structure that fulfills numerous functional objectives for all sizes, shapes and weights of meat-cuts.
5. The paradoxical ability to reduce in roasting meat the scientifically-known biological and physiological internal causes of juice loss and fiber toughness by use of an external non-biological, non-physiological, method and means.
6. The contradictory function of roasting meat at temperatures too hot for sustained human body contact, while resting the meat on a webbing that is always comfortable for such contact.
7. Changing a liability into an asset by using the meat's own fat coating (an economic and nutritional liability in today's dietary) as a soft pillow-like cushioning base (an economic and nutritional asset with my invention) on which to rest the attached economically-valuable, desirable-eating protein-portion of the meat; thus changing the undesirable-eating fat-portion liability of a beef roast into a valuable and ideal asset in reducing (and practically eliminating) weight-pressures and juice losses in the desirable protein portions.

It is these several foregoing surprising, paradoxical, and/or contradictory aspects that apparently have rendered the present discovery non-obvious to prior practitioners in this field of art.

While in the foregoing specification, a detailed description of specific embodiments of my invention were set forth for the purpose of illustration, it is to be understood that many of the details herein given may be varied considerably by those skilled in the art without departing from the spirit and scope of my invention.

I CLAIM:

1. A meat package wherein the meat is supported during shipping and roasting comprising a container and meat housed within and protected against pressures from outside weights by the container, a web attached to and supported by the container, the container and the web protecting the meat during the period of packaged life from the time of packaging through the time of meat roasting, said container-supported web providing a hammock type support on which said meat can rest in its original natural shape during shipping and roasting, with the minimum of only said meat's own weight bearing on its base area in order to reduce to said minimum the weight which can pressure-squeeze juice from said meat, said web being of a non-heat-retaining material which conforms substantially to the natural contour of the meat and which elevates said meat so that while being shipped and while being roasted within an oven said meat-holding web will isolate said meat against any outside pressures during shipping and against meat-searing metal surfaces within said oven during roasting.

2. The meat package of claim **1** wherein the container has four perpendicular sides, the web being fastened to the top edges of at least two of said sides in order to form the hammock suspended within said container, and the meat being a rib of beef resting fat side down on said hammock so that a curvature conforming to the natural outside curvatured shape of said beef is produced and maintained by the supporting contact of said web for said rib of beef, and said container having a perforated cover.

3. The meat package of claim **2** wherein the meat is a boneless beef roast.

4. The meat package of claim **1** wherein the web is made of a sheet of thermoplastic material molded to conform to the shape of the meat.

5. The meat package of claim **1** wherein the meat is a turkey being supported by the web in a breast side down position.

6. The meat package of claim **1** wherein the web is formed of flexible and shape-conformable material.

7. The meat package of claim **1** including a cover secured within the container and in contact with at least a portion of the upper surface of the meat whereby the meat will be supported by the cover when the container is turned upside down.

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