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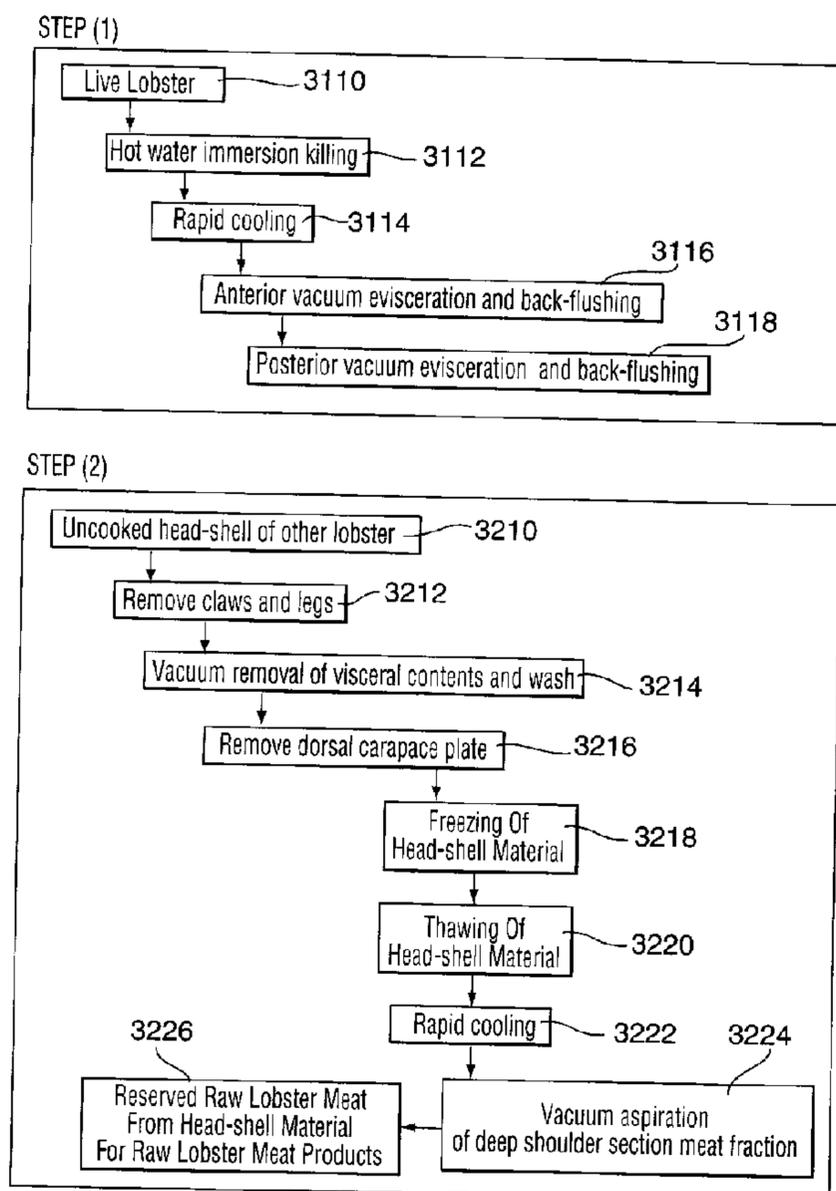
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(54) **METHODS DE CONGELATION-DECONGELATION POUR  
RECUPERER LA CHAIR FRAICHE DU CORPS DES  
CRUSTACES ET UTILISATION CONNEXE**

(54) **FREEZE-THAW METHODS FOR RECOVERING RAW MEAT  
FROM THE HEAD-SHELLS OF CRUSTACEANS AND USE  
THEREOF**



(57) A procedure is provided for the optimization of the utilization of crustaceans, e.g., whole lobsters, through the inclusion of under-utilized components. The procedure involves firstly, initiating the detachment of the raw edible deep-shoulder myotomal meat from deep-shoulder cartilaginous skeleton attachment by the step of subjecting the head-shell to at least one freeze-thaw cycle. Then, the so-treated head-shell is subjected to vacuum aspiration to remove, and to recover, the raw meat fraction. Procedures are further-described for the utilization of such recovered raw meat fraction, e. g., to provide lobster stuffing and to provide stuffed lobsters.



**ABSTRACT**

A procedure is provided for the optimization of the utilization of crustaceans, e.g., whole lobsters, through the inclusion of under-utilized components. The procedure involves firstly, initiating the detachment of the raw edible deep-shoulder myotomal meat from deep-shoulder cartilaginous skeleton attachment by the step of subjecting the head-shell to at least one freeze-thaw cycle. Then, the so-treated head-shell is subjected to vacuum aspiration to remove, and to recover, the raw meat fraction. Procedures are further-described for the utilization of such recovered raw meat fraction, e.g., to provide lobster stuffing and to provide stuffed lobsters.

**(a) TITLE OF THE INVENTION**

**FREEZE-THAW METHODS FOR RECOVERING RAW MEAT FROM THE HEAD-SHELLS OF CRUSTACEANS AND USE THEREOF**

5 **(b) TECHNICAL FIELD TO WHICH THE INVENTION RELATES**

The present invention relates to a method for optimizing the utilization of crustaceans, e.g., whole lobsters, through inclusion of under-utilized by-product components, which in combination with the intact crustacean, e.g., lobster, provides for an enhancement of intrinsic appearance and edible proportion of the intact crustacean,  
10 e.g., lobster. Particularly, this method has application among clawed lobsters of the Homaridae family, the clawless Spiny lobster and Rock lobster species of temperate and tropical origin and including species of the genera Panulirus, Jasus and Chelonectes. The method can also be applied to crab, and to lobster-like crustaceans, including some types of prawn, Nephrops norwegicus and freshwater crayfish species.

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**(c) BACKGROUND ART**

A traditional method for processing and packaging clawed lobsters of the Homaridae family consisted of cooking them whole, either by steam exposure or by hot water immersion, cooling the product and sealing them in plastic bags containing brine  
20 solution with subsequent freezing to render the lobster embedded in ice. Inherent to this traditional lobster frozen-in-brine product, a substantial degree of visceral staining of the edible meat components within the upper tail region was encountered. This was attributed, in part, to migration and rupture of the visceral hepatopancreatic fraction and intestinal tract contents during the preparative cooking procedure. Also inherent to this  
25 product were residual heavy-metal contaminants, which were predominately-located in the visceral fraction and which underwent migration to the edible body meat fraction as a result of cooking procedures.

Other traditional methods of processing intact lobsters consisted of freezing cooked lobsters, which were wrapped individually in wax paper in a master-box.  
30 Another common method involved the removal of the intact tail section of lobsters with

subsequent individual quick-freezing, and packaging the tails through alignment into a box. In such products, the raw lobster material either in an intact form, or as tail sections was prone to problems of breakage due to the brittle nature of their shell material. Particularly, such problems were encountered during distribution and transportation procedures.

The extraction of meat from the body of hard-shelled crustaceans, e.g., crab, crayfish, lobster, and rock shrimp, as opposed to soft-shelled crustaceans, e.g., all shrimp species, other than rock shrimp, has proved to be very difficult, time consuming and expensive. In present day practices, for obtaining the edible portions from such crustaceans e.g., lobster, crab, crayfish and the like, involved a variety of mechanical, electrical and heat-treatments which included subjecting the crustaceans to a sawing action on the shells, a high or low electrical voltage through the shells, treatment with direct flame, immersion in boiling water or various chemical treatments, treatment with steam at atmospheric pressure or under high pressures in closed vessels. A myriad of other procedures were also known which involved combinations of some or all of the foregoing methods. While some of the procedures had various degrees of success, most of the prior known procedures required hand labour to treat the individual fresh crustaceans in order to remove the edible flesh.

Both raw and cooked hard-shell sections of processed lobsters have heretofore been subjected to many treating methods, for example, freezing intact for subsequent transformation by boiling for rendering extraction of flavour, or proteinaceous solubles and non-soluble components for further culinary applications. In addition, the head-shell material of either raw or cooked lobster was subjected to grinding reduction and mechanical meat removal procedures.

Various mechanical methods have been developed to remove either raw or cooked meat from mechanically-reduced head-shell material. In some techniques, physical separation of the meat from the shell was effected through the use of riffle tank particle separation methods. The shell effectively settled to the bottom, and the extracted meat was concentrated by water fluming and screen collection. A recognized impediment to

this procedure was the loss of desirable and delicate flavour components attributed to the extensive washing procedures during separation.

In other traditional procedures, the cooked head-shells of lobster resulting from hand-shucking processing procedures were subjected to mechanical grinding and reduction through use of perforated rotating drum technology. In this method, the edible meat, and visceral components contained within the head-shell component were separated from the shell fraction by the application of variable belt pressure against a perforated stainless steel drum. The size of the apertures in the drum provided for physical separation of the softer meat and visceral components from the hard brittle shell and cartilaginous skeletal material. Such products arising were commonly recognized as "lobster mince" and found use as culinary ingredients within the food industry.

Many of the difficulties of removal of the meat stemmed from the physical structure of the hard crustacean shell, the manner in which the meat was stuck to the shell, the need to extract and maintain the meat in a minimum bacteriological manner, as well as the commercial desire to extract the meat in lump form rather than in many small pieces. The research, both by industry and universities, has been extensive and has resulted in various alleged improvements in the meat extraction processes.

Pre-treatment of the crustaceans by chemicals, the use of certain cooking conditions, the use of machines which squeezed the meat out, or which cored and centrifuged the meat out, or which air or water blasted the meat out, or which froze and exploded the meat out have been proposed and advanced with varying degrees of success.

Lobster, and limbs and claws thereof, have been efficiently used and formulated into limb-like or stick-like meat products or claw meat products. After removing the carapaces, gonads, branchiae and internals, the trunks were washed with water and ground-up. Then, the meat remaining in the trunks was recovered with a meat separator and was formulated into minced meat. This meat was further washed with water and the fibrous meat was taken therefrom and was formulated into flakes. Thus, various proteineous parts, which were mostly unutilized, including meat remaining in the carapace, the glands, branchiae and meat remaining in the trunks were not utilized, but was disposed of as such.

There are many patents which are directed to the processing of such shellfish. Non-limiting examples include the following patents.

5 Sterling G. Harris, in U.S. Patent Number 2,155,308, patented April 18, 1939, and assigned to The Blue Channel Corporation, provided a procedure for canning crabs, which involved a preliminary heat-treatment in an aqueous fluid.

U.S. Patent Number 2,501,655, patented March 28, 1950, by W.M. Altenburg, disclosed a method for loosening lobster meat from its shell by heating the surface of the lobster meat adjacent to the shell (by boiling), and subsequently freezing the whole lobster.

10 U.S. Patent Number 2,858,223, patented October 28, 1958, by Sterling G. Harris, and assigned to The Blue Channel Corporation, provided a method for separating meat from crustacean shells, in which the meat was cooked and the shell was then impacted to release the meat.

15 U.S. Patent Number 2,978,334, patented April 4, 1961, by Lapeyre, and assigned to The Peelers Company, described a general procedure for extracting edible portions of crustaceans, e.g., lobsters, crabs, etc., from the skeletal portions thereof. This included the sequence of freezing and subjecting the frozen skeletal portions to vacuum, in order to separate the meat from the shell, and then removing the meat manually.

20 U.S. Patent Number 3,513,071 patented May 19, 1970, by Gottlieb Bernhard Fehmerling, provided a method for the treatment of crustaceans, e.g., lobsters, crabs, etc. This included the use of a synergistic combination of enzymes that attacked the connective tissue which held the edible flesh to the shell.

25 Japanese Patent Number 46-10898, described a method wherein lobsters subjected to vacuum chamber conditions were exposed to protease enzymes in a temperature range of 50°C to 55°C for a period of time. By first vacuum eviscerating the crustaceans with subsequent release of vacuum and injection of steam, the raw meat attached to the shell of the lobster could be more effectively-separated and manually-removed.

U.S. Patent Number 3,705,040, patented December 5, 1972, by Peter W. Bynagte, and assigned to Westgate-California Foods, Inc., provided a procedure for

extracting meat from crustaceans by dipping them in a particular pyrophosphate or metaphosphate solution.

U.S. Patent Number 3,773,962, patented November 20, 1973, by Trelease et al, and assigned to A. Swift & Company, disclosed a method which included cleaning of the stomach and hind-gut of lobster by the use of vacuum to remove the contents of the stomach and visceral cavity.

U.S. Patent Number 4,053,694, patented October 18, 1977, by James E. Rutledge, provided a procedure for pre-treating hard-shelled crustaceans, e.g., lobsters, crabs, etc., to facilitate the removal of uncooked meat therefrom. This included the steps of freezing, and then thawing and extracting the uncooked meat from the shell by conventional manual, mechanical or centrifugal procedures.

U.S. Patent Number 4,340,613, patented July 20, 1982, by Michael P. Moore, described a method for cooking crustaceans, e.g., lobsters, crabs, shrimp, etc. This method included steam cooking with subsequent application of vacuum to extract the moisture from within the shell.

Other patents taught the production of seafood pastes. Non-limiting examples include the following:

U.S. Patent Number 4,588,601, patented May 13, 1986, by T. Maruyama et al, and assigned to Kibun Company Limited, provided a method of producing a paste-product, from, e.g., various fish to provide pseudo lobster meat. This included dividing a fine-paste product, which had already been coagulated by heating, mixing the divided product with a protein mixture and then moulding the resulting mixture. The mixing and/or moulding procedure was carried out under reduced pressure and then the moulded product was heated.

U.S. Patent Number 4,816,278, patented March 28, 1989, by Sasamoto et al, and assigned to The Japanese Research and Development Association for Extrusion Cooking, Nippon Suisan Kabushiki Kaisha, Taiyo Fishery Co. Ltd., Kabushiki Kaisha Kobe Seikoshu, Ajikan Col Ltd., and Kougyo Co. Ltd., provided a method for processing and treating raw crustaceans, e.g., lobsters, mollusks and seaweed mixtures. This material

was mixed together and an optional additive, e.g., soyprotein, wheat flour or starch, was added to the mixture by means of a twin-screw extruder.

U.S. Patent Number 4,820,529, patented April 11, 1989, by Y. Uchida et al, and assigned to Asahi Denka Kogyo Kabushiki Kaisha, provided a procedure for efficiently-  
5 utilizing the meat of crustaceans, e.g., lobster, or crab. This involved utilizing the meat remaining in the trunks and carapaces, by boiling and milling the crustaceans under sufficient conditions for inactivating the enzymes contained therein. Then, added proteolytic enzymes and/or microorganisms were allowed to act thereon.

U.S. Patent Number 5,560,954, issued October 1, 1996, to Gabriel Elbaz,  
10 described a method for preparing a culinary base product from the head-shell of lobster and other crustacean species. This involved a combination of oven heating the intact head-shell material, then subjecting it to mechanical-size-reduction with subsequent emulsification and addition of thickening agents for product stabilization. For the final product, this method provided for the use of both the carapace shell and the soft tissue  
15 components.

Thus, none of the conventional methods described above provided a procedure which combined the by-products and the inefficiently-utilized components of lobster processing into an embodiment, which enhanced the convenience of the intact product and overcame the limitations of the prior art.

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**(d) DESCRIPTION OF THE INVENTION**

An object of one aspect of the present invention is to provide for a novel crustaceans processing procedure, which maximizes the use and presentation of formerly-unutilized body parts thereof.

25 An object of another aspect of this invention is to provide a procedure which includes a technique which facilitates the loosening and the removal of the edible flesh from crustaceans.

An object of another aspect of this invention is to provide a procedure which includes a technique for extracting meat from crustaceans, particularly lobster, crab, etc.

An object of another aspect of this invention is to provide a procedure which includes a technique for extracting meat from crustaceans, particularly lobster, crab, etc., that has a shorter processing time, is more economical, and that removes the meat in a substantially-whole form.

5 An object of another aspect of this invention is to provide a procedure which includes a technique which substantially-eliminates the need for an excess of manual operations.

10 An object of another aspect of this invention is to provide a procedure which includes a technique which attacks and at least partially-dissolves or weakens the connective tissue between the shells of crustaceans and the edible flesh.

An object of another aspect of this invention is to provide a procedure which includes a technique of producing a paste-product from lobster roe and lobster meat.

15 An object of another aspect of this invention is to provide a procedure which includes a technique which provides an improved method of preparing a whole, cooked, stuffed and frozen lobster product.

An object of another aspect of this invention is to provide a procedure which includes a technique for the removal of the uncooked meat from hard-shelled crustaceans.

20 By one first broad aspect of this invention, a method is provided for removing meats from the head-shell of a shelled marine creature which comprises: initiating the detachment of the raw edible muscle meat from the deep-shoulder cartilaginous skeletal attachment by the step of subjecting the head-shell to at least one freeze-thaw cycle, and subjecting the so-treated head-shell to vacuum aspiration to remove and recover the raw meat fraction in lump form.

25 By one variant of this first broad aspect of this invention, the head-shell is subjected to a freezing procedure at a temperature of ranging from  $-10^{\circ}\text{C}$  to  $-20^{\circ}\text{C}$ , followed by thawing of the frozen head-shell until a temperature of between  $4^{\circ}\text{C}$  and  $12^{\circ}\text{C}$  is reached.

30 By a second variant of this first broad aspect of this invention, the method includes the post-thawing step of subjecting the head-shell material to conditions of cold water treatment in the temperature range of  $1^{\circ}\text{C}$  to  $10^{\circ}\text{C}$  for a period of between 1

minute to 10 minutes to effect heat removal from the head-shell material. By one variation thereof, the method includes the step of exposing the treated head-shell material to cold water in the temperature range of 1°C to 10°C for a period of between 3 minutes to 8 minutes to effect heat removal from the head-shell material.

5 By a third variant of this first broad aspect of this invention, the method includes the step of vacuum aspiration of the so-treated deep-shoulder section lobster meat fraction under 15 inches of Hg. to 25 inches of Hg.

10 By a second broad aspect, the present invention provides a method for preparing stuffed, intact, whole, lobster, which comprises vacuum eviscerating the anterior and posterior sections of the lobster, back flushing the anterior and posterior sections of the lobster for the removal of the visceral and intestinal contents of the lobster, and filling the anterior visceral cavity of the lobster with a stuffing comprising a raw blend comprising female lobster roe and deep-shoulder section myotomal tissue from a lobster, which has been removed and recovered in the manner described above, thereby providing  
15 stuffed, intact, whole, lobster.

By a second variant of this second broad aspect of this invention, and/or the above variant thereof, the method includes the step of subsequently freezing the stuffed, intact, whole, lobster.

20 By a third variant of this second broad aspect of this invention, and/or the above variants thereof, the method includes the step of cooking the stuffed, intact, whole, lobster at 100°C for a sufficient time to achieve internal carapace temperature of at least 75°C, followed by subsequent rapid-cooling to effect rapid temperature removal, and finally freezing the stuffed, intact, whole, lobster. By a first variation thereof, the cooking of the stuffed, intact, whole, lobster is by steam cooking. By a second variation  
25 thereof, the cooling of the cooked stuffed, intact, whole, lobster is by spray irrigation. By a third variation thereof, the method includes the step of exposing the treated head-shell material to cold water in the temperature range of 1°C to 10°C for a period of between 3 minutes to 8 minutes, to effect removal of heat from the head-shell material. By a fourth variation thereof, the method includes the step of vacuum aspiration of the  
30 loosened myotomal tissue from the deep-shoulder section of the treated head-shell

material in the range of 15 inches of Hg. to 25 inches of Hg., thereby to provide the deep-shoulder section myotomal tissue which has been removed and recovered in the manner described above for the stuffing.

5 By a fourth variant of this second broad aspect of this invention, and/or the above variants thereof, the raw blend comprising female lobster roe and deep-shoulder section myotomal tissue, which has been removed and recovered only in the manner described above, is prepared by the step of blending deep-shoulder section myotomal tissue which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, with lobster roe which has been manually-removed from gravid  
10 female lobster. By a first variation thereof, the proportions of the female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is in the range of between 10% and 50% by weight of the female lobster roe, and correspondingly between 90% and 50% by weight of that deep-shoulder section myotomal tissue, which  
15 has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation. By a second variation thereof, the blending is carried out in a food processor. By a third variation thereof, the method includes the step of blending therein from 1% by weight to 10% by weight of a food grade starch, thereby to ensure freeze-thaw stability and performance of the cooked blended stuffing.

20 By a fifth variant of this second broad aspect of this invention, and/or the above variants thereof, the raw blend comprising female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is introduced into the anterior visceral cavity of the previously-eviscerated lobster, by oral intubation and subsequent  
25 vibration to effect removal of residual air, thereby to achieve effective filling of the anterior visceral cavity, effecting integuous contact between the liquid blend and the contour of the inner shell surface and region of abutment of the internal and anterior abdominal facets of the tail meat of the previously-eviscerated lobster.

30 By a sixth variant of this second broad aspect of this invention, and/or the above variants thereof, the stuffing of female lobster roe and deep-shoulder section myotomal

tissue which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is steam-cooked until an internal temperature of between 75°C and 85°C is obtained, thereby to confer a mousse-like texture and a desirable pink coloration to the stuffing blend.

5 By a seventh variant of this second broad aspect of this invention, and/or the above variants thereof, the steam-cooked lobster which is stuffed with a stuffing of female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation is subsequently-cooled by spray irrigation to the dorsal surface of the lobster, thereby to effect rapid-cooling to avoid overcooking and thereby to maintain high quality and integrity to the lobster meat and to the stuffing.

10 By an eighth variant of this second broad aspect of this invention, and/or the above variants thereof, the vacuum aspiration of the anterior visceral cavity and the posterior intestinal tract is accompanied by back-flushing with a dilute aqueous solution of lactic acid, thereby to confer a bacteriostatic property to the eviscerated lobster. By a first variation thereof, the lactic acid is used in a concentration range of 5 ml/L to 20 ml/L (w/w).

15 By a third broad aspect of this invention, a stuffed, intact, whole, lobster is provided in which the visceral and intestinal contents of the lobster have been removed, the lobster being filled with a stuffing comprising a raw blend comprising female lobster roe and deep-shoulder section myotomal tissue which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation from another lobster or other lobsters.

20 By one variant of this third broad aspect of this invention, the intact, whole, lobster which is stuffed with female lobster roe and deep-shoulder section myotomal tissue, is in the form of frozen stuffed, intact, whole, lobster.

25 By a second variant of this third broad aspect of this invention, and/or the above variant thereof, the stuffed, intact, whole, lobster which is stuffed with female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is in the form

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of initially-cooked, such intact, whole, lobster which has been stuffed with female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, and which has been cooked at 100°C for a sufficient time to achieve an internal carapace temperature of at least 75°C. By a first variation thereof, the intact, whole, lobster which has been stuffed with female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is in the form of a lobster which has been rapidly cooled to effect rapid temperature removal, and finally which has been frozen.

By a third variant of this third broad aspect of this invention, and/or the above variants thereof, the intact, whole, lobster which is stuffed with female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is form of steam-cooked, stuffed, intact, whole, lobster. By one variation thereof, the intact, whole, lobster which has been stuffed with female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is in the form of steam-cooked and spray-irrigated-cooled such stuffed, intact, whole, lobster.

By a fourth variant of this third broad aspect of this invention, and/or the above variants thereof, the stuffed, intact, whole, lobster in which the stuffing comprises female lobster roe which has been manually-removed from gravid female lobster and deep-shoulder section myotomal tissue which has been retrieved from the head-shell of a lobster or from other lobsters, by a freeze/thaw cycle followed by vacuum intubation. By a first variation thereof, the proportions of the female lobster roe and the deep-shoulder section myotomal tissue which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by vacuum intubation, are in the range of between 10% and 50% by weight of the female lobster roe, and correspondingly between 90% and 50% by weight of the deep-shoulder section myotomal tissue. By a second variation thereof, freeze-thaw stability and performance of the cooked, blended stuffing is ensured by providing the stuffing as a blend of female lobster roe and deep-shoulder

section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, which also contains from 1% by weight to 10% by weight of a food grade starch.

5 By a fifth variant of this third broad aspect of this invention, and/or the above variants thereof, the effective filling of the anterior visceral cavity is ensured to effect  
10 integuous-contact between the stuffing of female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, and the contour of the inner-shell surface and the region of abutment of the internal and anterior abdominal facets of the  
15 tail meat of the lobster, by having the stuffing of female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, introduced into the anterior visceral cavity of a previously-eviscerated lobster by oral intubation and subsequent vibration to effect removal of residual air.

20 By a sixth variant of this third broad aspect of this invention, and/or the above variants thereof, the stuffing of female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is in the form of a mousse-like texture and a desirable pink coloration, by having the stuffing steam-cooked until an internal temperature of  
25 between 75°C and 85°C is obtained.

30 By a seventh variant of this third broad aspect of this invention, and/or the above variants thereof, the intact, whole, lobster which is stuffed with female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is in the form in which  
25 overcooking is avoided and thereby in which high-quality and integrity to the lobster meat and to the stuffing is maintained, by having the steam-cooked stuffed lobster subsequently-cooled by spray irrigation to the dorsal surface of the lobster.

By an eighth variant of this third broad aspect of this invention, and/or the above variants thereof, the intact, whole, lobster which is stuffed with a stuffing of female  
30 lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from

the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, is in the form in which a bacteriostatic property has been conferred to the eviscerated lobster, by accompanying the vacuum aspiration of the anterior visceral cavity and the posterior intestinal tract by back-flushing with a dilute aqueous solution of lactic acid. By a first variation thereof, the lactic acid is used in a concentration range of 5 ml/L to 20 ml/L (w/w).

By a ninth variant of this third broad aspect of this invention, and/or the above variants thereof, the so-treated deep-shoulder section lobster meat, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by vacuum intubation, has been removed from the head-shell by vacuum aspiration under 15 inches of Hg. to 25 inches of Hg.

By a fourth broad aspect of this invention, a stuffing is provided comprising a raw blend of female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by vacuum intubation, from another lobster or other lobsters.

By a first variant of this fourth broad aspect of this invention, the stuffing comprises female lobster roe which has been manually-removed from gravid female lobster and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by vacuum intubation, from other lobsters. By a first variation thereof, the proportions of the female lobster roe and the deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by vacuum intubation, are in the range of between 10% and 50% by weight of the female lobster roe, and correspondingly between 90% and 50% by weight of the deep-shoulder section myotomal tissue. By a second variation thereof, the freeze-thaw stability and performance of the cooked, blended stuffing is ensured by providing the stuffing of female lobster roe and deep-shoulder section myotomal tissue, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation, as a blend which also contains from 1% by weight to 10% by weight of a food grade starch.

By a second variant of this fourth broad aspect of this invention, and/or the above variant thereof, the stuffing of female lobster roe and deep-shoulder section myotomal tissue is in the form of a mousse-like texture and a desirable pink coloration, by steam-cooking the stuffing until an internal temperature of between 75°C and 85°C is obtained.

5 In accordance with a generalized aspect of this invention, a method is provided for preparing an intact stuffed lobster product. The method utilizes raw roe from gravid female lobsters which is blended with raw lobster meat, which has been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by a vacuum intubation. In  
10 a first step, lobsters, which are killed by hot water immersion and chilled by cold water immersion, are subjected to evisceration of the anterior visceral cavity by oral insertion of a vacuum aspirator. Accompanying the evisceration procedure, a back-flushing process serves to irrigate and wash the visceral cavity with a weak solution of an organic acid. In a second step, the posterior intestinal tract is cleaned, by posterior insertion of a vacuum aspirator incorporating a back-flushing procedure as described above. In a  
15 third step, the head-shell of freshly killed lobsters, from which the claws, leg parts and dorsal carapace shell material have been removed, are subjected to at least one freeze/thaw cycle to facilitate detachment of raw edible muscle (meat) from deep-shoulder cartilaginous skeletal attachments. Following this procedure, the head-shell material is subjected to immersion in cold water to eliminate excess thermal inputs causing deteriorative changes in the functional properties of the raw meat fraction. From  
20 this point, the head-shell material is subjected to vacuum aspiration to remove the raw meat fraction, which is then retained under either chilled or frozen conditions. In a fourth step, roe which has been manually-separated from a freshly-killed gravid female lobster, is blended in certain proportions with deep-shoulder extracted meat, which has  
25 been retrieved from the head-shell of a lobster by a freeze/thaw cycle followed by vacuum intubation, to form a creamy liquid. During this step, an edible binder, e.g., starch may be added to provide freeze-thaw stability and texture to the final product. In a fifth step, the liquid blend is intubated via the oral orifice into the visceral cavity of previously-eviscerated lobster. A brief mechanical vibration of the lobster is conducted  
30 to ensure that the filling procedure is complete and evenly-distributed, and that air in the

visceral cavity has been minimized. In a sixth step, the eviscerated raw lobster containing the liquid blend is either frozen or subjected to steam cooking. Implicit to the steam cooking procedure is the arrangement of the lobster with the ventral surface facing uppermost. In a seventh step, following steam cooking, the stuffed lobster product is subjected to spray irrigation with cold water to eliminate overcooking and to maintain textural and sensory integrity of the product. The product is subsequently frozen. In an eighth step, either raw eviscerated lobster, stuffed raw lobster and/or stuffed cooked lobster are optionally-subjected to bi-sectional cutting along the longitudinal axis, or to remain as an intact product, and are then packaged, preferably by means of vacuum sealing in a flexible barrier pouch. The raw stuffed product, so prepared, is subsequently thawed and preferably steam-cooked prior to utilization. The cooked stuffed product, so prepared, is subsequently thawed and presented, either as whole lobster, bi-sectional split lobster as two halves, or it can be bi-sectioned at point of presentation. The cooked product, so prepared, can be served either cold or be subjected to warming-over, as desired.

**(e) DESCRIPTION OF THE DRAWINGS**

In the accompanying drawings,

FIG. 1 is a top view of a whole lobster;

FIG. 2 is a side view, in half-section, of a whole lobster;

FIG. 3A illustrates one embodiment of the invention as a flow chart of the first two out of five preparative steps which are followed to obtain the stuffed lobster product; and

FIG. 3B illustrates one embodiment of the invention as a flow chart of the last three out of five preparative steps which are followed to obtain the stuffed lobster product.

**(f) DESCRIPTION OF THE PRIOR ART**

One prior art technique of cleaning-out the internal system of a lobster is by flushing-out with a suitable solution. Referring to FIGS. 1 and 2,, flushing of a lobster

10 can be carried-out by inserting a spray nozzle (not seen) into the mouth 12 of the lobster 10 through mandibles. Sea water or salt water, which is at room temperature or colder, is sprayed through the spray nozzle, under a pressure of from 5 psig to 20 psig. The stomach contents are generally flushed-back-out through the mouth 12, thus  
5 cleaning-out the stomach 14. Moreover, the pressurized water is effective to flush-out the undesirable contents of the intestinal track 18 and cloaca 20 through the anus 22. In this manner, the organic and inorganic debris is eliminated from the gastrointestinal system of the lobster.

10 One previously-described spray nozzle device for carrying-out the flushing step, as taught by the prior art, is a thin hollow tube having a 1/16 inch orifice at the end, and four additional 1/16 inch orifices, spaced at 90° intervals about the side walls of the tube. Flushing is achieved when the spray nozzle is inserted through the mouth 12 and the mandibles 14 of the lobster 10, and is thereafter rotated-about by hand within the lobster 10.

15 Another technique for removing the contents of the internal organs of the lobster is effective, a preferred technique for cleaning-out the hind-gut of the lobster, as taught by the prior art, involves suction evisceration. This technique comprises making a small slit 24 in the abdomen (lobster tail) 26 in the area of the cloaca 20 of the lobster 10. Although this slit may be made on the top-side or the under-side of the lobster, the slit  
20 may be made through the posterior part of the abdominal shell 28 on the top-side of the lobster 10. A vacuum tube (not seen) is then inserted through the slit 24, and is used to suck-out the whole hind-gut comprising the intestinal tract (vein) 18 and cloaca 20. Suction evisceration of the hind-gut is generally always carried-out prior to cooking.

25 As taught by the prior art, the suction nozzle (not seen) will generally have an inside diameter of 1/4 inch, in order effectively to remove the hind-gut of the lobster 10. Also, the nozzle (not seen) will generally be operated under a vacuum of from 15 inches to 25 inches Hg, and removal of the hind-gut can generally be accomplished in from 3 seconds to 5 seconds.

30 The stomach 16 of the lobster 10 can subsequently be removed by insertion of the suction nozzle through the mouth 12 between mandibles 14. Suction removal of the

stomach 16 and the stomach contents generally requires a longer period of time than the suction-removal of the hind-gut, and usually will require from 5 seconds to 15 seconds.

**(g) AT LEAST ONE MODE FOR CARRYING OUT THE INVENTION**

5 The method of one preferred embodiment of this invention will now be described with reference to the processing of clawed lobsters of the Homaridae family. However, it is desired to emphasize that, with suitable modifications which will be apparent to those skilled in the art, this method can also be applied to the clawless Spiny lobster and Rock lobster species of temperate and tropical origin and including species of the genera  
10 Panulirus, Jasus and Chelonectes crab, and to lobster-like crustaceans, including some types of prawn, Nephrops norvegicus and freshwater crayfish species.

The method involved in one embodiment of the present invention for preparing a stuffed lobster product is comprised of five steps, respectively referred to as (1), (2), (3), (4) and (5), and are described with reference to FIG. 3A and FIG. 3B.

15 Step (1)

The first step, Step (1) of the method of this embodiment of the invention, involves killing of live lobsters (block 3110) by hot-water blanch immersion (block 3112), in conditions ranging between 50°C and 95°C, for a duration of between 40 seconds to 80 seconds, with immediate transfer to cold water conditions (block 3114)  
20 ranging between 0°C to 10°C for a duration of between 2 minutes to 10 minutes. Lobsters, so-treated, are then subjected to vacuum evisceration of the anterior visceral region (block 3116), e.g., as described above, using a vacuum aspirator nozzle of between 10 cm to 16 cm in length with a diameter of between 5mm to 10mm inserted into the oral cavity. Concurrently with this procedure, a back-flushing pipe attached to  
25 the vacuum nozzle supplies a dilute solution of lactic acid in a concentration range of 5mg/L to 20mg/L (w/w) as a bacteriostatic agent. The vacuum is applied in the range of 15 inches to 25 inches of Hg and the visceral contents are removed in a period of time ranging between 5 seconds to 15 seconds. Following this procedure, a second vacuum aspirating nozzle with a length ranging between 5cm to 15cm and a diameter of between  
30 1mm to 5mm is inserted into the anal orifice, to effect vacuum cleaning, and

concurrently back-flush irrigation (block 3118) with a dilute solution of lactic acid in a concentration range of 5mg/L to 20mg/L (w/w) as a bacteriostatic agent. The latter procedure is preferably accomplished within a period of between 5 seconds and 20 seconds. In one preferred embodiment, the above eviscerated and back-flushed lobster product is maintained in either a fresh or frozen-thawed condition prior to inclusion of the stuffing-blend material.

Step (2)

In the second step, Step (2) of the method of this embodiment of the invention, raw head-shell sections of lobsters (block 3210), generally-derived from lobsters which have been subjected to raw-tail-severance procedures, are then subjected to vacuum removal of visceral contents and washing, as previously-described (block 3214). Then the lobster is prepared by manual removal of legs and claws (block 3212), prior to the manual removal of the dorsal carapace plate (block 3216), which reveals the remaining head-shell section containing the edible meat fractions which are intimately-connected and associated with the cartilaginous exoskeleton. Particularly, the deep-shoulder sections yielding up to 5% of edible meat fraction from the lobster are the focus of this second step. Head-shell carapace material, so-prepared, is subjected to at least one cycle of freezing (block 3218) and thawing (block 3220), which facilitates the subsequent vacuum aspiration of the deep-shoulder myotomal meat from the deep-shoulder fraction. Following the thawing procedure, the head-shell material is immediately-transferred to cold water conditions for rapid-cooling (block 3222), at a temperature range of between 1°C and 10°C for a period of time between 3 minutes and 8 minutes. This procedure provides for rapid-cooling of the material and maintenance of the quality attributes of the meat components. The loosened deep-shoulder myotomal meat is then removed from the deep-shoulder compartments by vacuum aspiration (block 3224), utilizing a vacuum nozzle of between 10cm to 16cm length and a diameter of between 5mm and 10mm. Deep-shoulder myotomal meat so-removed, is collected in pan-traps which are associated with the vacuum line, providing a vacuum between 15 inches to 25 inches of Hg. In this embodiment, vacuum extraction of between 1kg to 2kg per person/hour of raw deep-shoulder myotomal meat can be obtained. The deep-shoulder myotomal meat so-

extracted can either be held chilled, or frozen prior to further use, for the stuffing recipe to be described in Step (3), hereinafter, or it may be reserved for other applications in other conventional raw lobster meat products and recipes (block 3226).

5 The reserved raw lobster deep-shoulder myotomal meat retrieved from the head-shell in Step (2) can be used for a variety of other lobster products.

### Step (3)

10 In the third step, Step (3) of the method of this embodiment of the invention, raw roe is removed from the head-shell section of gravid female lobsters (block 3310), and the lobster is subjected to traditional raw-tail severance processing methods. The roe is manually-extracted and subjected, either to chilling, or freezing under vacuum conditions. If frozen, the roe must be thawed prior to blending with the deep-shoulder section meat which has been extracted according to procedures described in the above Step (2). The roe and the deep-shoulder myotomal meat fractions are blended together (block 3312) in a proportion ranging from between 10% to 50% for the roe, and correspondingly 90% to 50% for the deep-shoulder myotomal meat. The blending procedure is preferably achieved by use of a food processor, e.g., the one sold by Mari-tech Ltd. (Canada) until a creamy liquid consistency is achieved. During such processing, from 900g to 990g per kilogram of blend, and e.g., from 10g to 100g of an edible starch, e.g., the one sold by Nacan Products Limited (USA), is added to the blend (block 3314), to ensure its freeze-thaw stability. The lobster roe and the deep-shoulder myotomal meat extracted as described in Step (2) above (block 3310) is mixed with the starch (block 3314). The lobster roe and the deep-shoulder myotomal meat extracted as described in Step (2) above (block 3310) to the starch (block 3314) weight ratio may vary from between 5:5 to 9:1, a desirable range being from 6:4 to 8:2.

25 The paste of lobster roe and the deep-shoulder myotomal meat extracted as described in Step (2) above and starch mixture (block 3312) may be mixed under reduced pressure. Ordinarily, the mixing under reduced pressure may be accomplished by agitating in an agitator that can be sealed hermetically, and can provide inside an environment of reduced pressure. The degree of reduced pressure is e.g., 0mm to 30 260mm Hg. According to this embodiment of the present invention, the mixture may

be agitated rapidly at a reduced pressure near vacuum. The mixing may be successfully-accomplished under such reduced pressure, at 260mm of Hg pressure or less.

Examples of suitable agitators include a mixer, kneader, cutter, and so on which permit adequate agitation, e.g., one where all, mixer, etc., can be utilized at one time.

5 For example, an agitator which may be used is one that is provided with a moving vane inside thereof, which rotates at the rate of 40rpm. The agitator may be provided with a cover in the upper part to be sealed hermetically, and is connected with a decompression device via a hose to keep the pressure of 0mm to 260mm Hg inside the agitator. At this point, the liquid-blend can either be frozen, preferably under vacuum,  
10 or intubated into eviscerated lobsters in the chilled form.

#### Step (4)

In the fourth step, Step (4) of this method of this embodiment of this invention, the raw blend material prepared from raw roe and deep-shoulder myotomal meat components, as described above, are introduced into the eviscerated and back-flushed  
15 visceral cavity of the lobster, via oral intubation (block 3410). In this procedure, a metering pump can be utilized, e.g., the one sold by Mari-tech Ltd. (Canada). Dependent upon the size range of the lobster, the amount of blend introduced in the oral cavity will vary. By way of example, the principles of this embodiment of this invention can be applied to lobsters of varying size range, and most commonly weigh between  
20 250g and 1.5kg. Such amounts required to fill the visceral cavity of lobsters amount to between 10% and 15% of the final weight of the lobster. Following metered filling of the visceral cavity, the lobster is subjected briefly to mechanical vibration (block 3412), wherein the filled lobster is maintained in a vertical position, with the oral cavity facing uppermost and subjected to a gentle vibrating force. In this procedure, any residual air  
25 pockets entrained within the visceral cavity are voided and a complete fill of the cavity is ensured. The final product of this step is a raw stuffed lobster product (block 3414).

#### Step (5)

In the final fifth step, Step (5), of this method of this embodiment of this invention, the raw stuffed lobster product (block 3510) can either be frozen as is, for  
30 subsequent thawing and cooking (block 3512), and then vacuum-packed with shrunk-film

(block 3514), or it can be subject to immediate cooking in atmospheric steam conditions (block 3516) of 100°C. Advantageously, very good results have been obtained by placing the raw stuffed lobster ventral side uppermost into a process dedicated steam chamber, e.g., the one sold for this purpose by Atlantic Systems Manufacturing Ltd. (Canada), with sufficient duration to achieve an internal temperature in the centre point of the stuffing blend of within the visceral cavity of between 70°C to 85°C. This procedure is generally-achieved in a time-frame of between 15 minutes to 20 minutes, and serves approximately to cook the lobster and stuffed contents while still maintaining the integral tail, leg and claw meat sections in an optimal condition. Immediately following attainment of the desired internal temperature, of between 75°C to 85°C, and to avoid post-cook drying of the delicate meat and stuffing blend, it has been proven necessary to cool the cooked product rapidly.

The optimal method of cooling the cooked lobster product has been to subject the cooked lobster to hydro-cooling by cold water spray irrigation (block 3518), directed as a drench to the dorsal surface of lobsters positioned with the dorsal surface uppermost. Most efficient results have been obtained through the use of a process-dedicated hydro-cooling device, e.g., the one sold by Atlantic Systems Manufacturing Ltd. (Canada). In such application, optimal results can be obtained through the use of either potable fresh water or sea water, in the temperature range of between 1°C and 9°C, for a cooling period of between 5 minutes and 10 minutes, then effecting acceptable heat-reduction from within the centre of the lobster to between 20°C to 30°C. Other procedures involving immersion in ice-water mixes or ice *per se* can be utilized, but these procedures do not lend themselves to industrial applications.

As a part of this final step, either raw stuffed lobster is subjected to freezing (block 3512), or steam-cooked and cooled stuffed lobster is subjected to freezing conditions (block 3522). In either case, the frozen lobster is then packaged in vacuum-sealable pouches under deep vacuum, in the range of 25 inches to 30 inches of Hg (block 3514 or block 3524). Optionally, prior to packaging, frozen stuffed and cooked lobster can be bi-sectioned (block 3526), along the longitudinal axis by band-sawing and reconfigured as an intact product prior to vacuum packaging. In terms of the packaging

material, optimum shelf-life results are obtained through use of a heavy-duty shrinkable film laminate, e.g., the material sold by Cryovac (Canada). Moreover, the subsequent film-shrinking by heat exposure serves to minimize potential for breakage of appendages and body parts of the lobster, which is a recognized problem due to the brittle shell characteristics of the lobster.

With the above-described preparative methods of this embodiment of this invention, and with the equipment specifically-designed to support the procedures, up to 400 units per hour of finished lobster products can be processed, which is commercially interesting and appealing.

The product, so-obtained, has proven to offer excellent taste and texture characteristics, served in either the intact form, or as bi-sectioned split halves. The product can be presented as either chill-thawed or re-warmed, as preferred by consumers. The high-quality appearance of the product is assured through definition of very white meat containing no visible intestinal content, nor hepatopancreatic visceral staining, and a very attractive coral pink stuffing, which through the preparative method is assured, of attaining very intimate entrainment and interface to the internal shell contours and anterior abdominal facet of the tail meat. The overall appearance is of a continuum of stuffing-blend and white tail meat. This embodiment of this invention serves to meet ever increasingly-stringent requirements by nations for minimum acceptable tolerance levels for certain heavy-metal components.

**Claims**

1. A method for removing meat from the head-shell of shelled crustaceans which comprises:
  - a) initiating the detachment of the raw edible deep-shoulder myotomal meat from the deep-shoulder cartilaginous skeletal attachment by the step of subjecting said head-shell to at least one freeze-thaw cycle;
  - and b) subjecting the so-treated head-shell to vacuum aspiration to remove and recover the raw meat fraction.
2. The method as claimed in claim 1, wherein the head-shell is subjected to a freezing procedure at a temperature of ranging from  $-10^{\circ}\text{C}$  to  $-20^{\circ}\text{C}$ , followed by thawing of the frozen head-shell until a temperature of  $4^{\circ}\text{C}$  to  $12^{\circ}\text{C}$  is reached.
3. The method as claimed in claim 1, or claim 2, including the post-thawing step of subjecting said head-shell material to conditions of cold water treatment in the temperature range of  $1^{\circ}\text{C}$  to  $10^{\circ}\text{C}$  for a period of between 1 minute to 10 minutes to effect heat removal from said head-shell material.
4. The method as claimed in claim 3, including the step of exposing said treated head-shell material to cold water in said temperature range of  $1^{\circ}\text{C}$  to  $10^{\circ}\text{C}$  for a period of between 3 minutes to 8 minutes to effect said heat removal from said head-shell material.
5. The method as claimed in claims 1 to 4, including the step of vacuum aspiration of the so-treated deep-shoulder section lobster meat fraction under 15 inches of Hg. to 25 inches of Hg.
6. A method for preparing stuffed, intact, whole, lobster, which comprises:
  - vacuum eviscerating the anterior and posterior sections of said lobster;
  - back-flushing said anterior and posterior sections of said lobster for the removal of the visceral and intestinal contents of said lobster; and
  - filling said anterior visceral cavity of said lobster with a stuffing comprising a raw blend comprising female lobster roe and deep-shoulder section myotomal tissue recovered from a lobster, which has been obtained by the steps of subjecting a head-shell of a

lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue;

thereby providing stuffed, intact, whole, lobster.

7. The method as claimed in claim 6, including the step of freezing said stuffed, intact, whole, lobster.

8. The method as claimed in claim 6, including the step of cooking said stuffed, intact, whole, lobster at 100°C for a sufficient time to achieve internal carapace temperature of at least 75°C, followed by subsequent rapid cooling to effect rapid temperature removal, and finally freezing said stuffed, intact, whole, lobster.

9. The method as claimed in claim 8, wherein said cooking of said stuffed, intact, whole, lobster is by steam-cooking.

10. The method as claimed in claim 8 or claim 9, wherein said cooling of said cooked stuffed, intact, whole, lobster is by spray irrigation.

11. The method as claimed in claims 6 to 10, including the step of vacuum aspiration of the loosened myotomal tissue from said deep-shoulder section of said treated head-shell material in the range of 15 inches of Hg. to 25 inches of Hg., thereby to provide said deep-shoulder section myotomal tissue for said stuffing, and to remove and to recover deep-shoulder section myotomal tissue, for said stuffing.

12. The method as claimed in claims 6 to 11, wherein said raw stuffing blend comprising said female lobster roe and said deep-shoulder section myotomal tissue, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, is prepared by the step of blending said deep-shoulder section myotomal tissue with said female lobster roe which has been manually-removed from a gravid female lobster.

13. The method as claimed in claim 12, wherein the proportions of said female lobster roe and said deep-shoulder section myotomal tissue, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, is in the range of between 10 and 50 % by weight of said female lobster roe and

correspondingly between 90% and 50 % by weight of said deep-shoulder section myotomal tissue.

14. The method as claimed in claims 6 to 13, wherein said stuffing is provided by blending which is carried out in a food processor.

15. The method as claimed in claims 5 to 13, including the step of blending, into said blend comprising female lobster roe and deep-shoulder section myotomal tissue which has been recovered from a lobster, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, of from 1 % by weight to 10 % by weight of a food grade starch;

thereby to ensure freeze-thaw stability and performance of cooked blended stuffing.

16. The method as claimed in claims 6 to 15, wherein said raw stuffing blend comprising said female lobster roe and said deep-shoulder section myotomal tissue, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, is introduced into said anterior visceral cavity of said previously eviscerated lobster by oral intubation and subsequent vibration to effect removal of residual air;

thereby to achieve effective filling of said anterior visceral cavity effecting integuous contact between said liquid blend and the contour of the inner shell surface and region of abutment of the internal and anterior abdominal facets of the tail meat of said previously-eviscerated lobster.

17. The method as claimed in claims 8 to 16, wherein said stuffing is steam-cooked until an internal temperature of between 75°C and 85°C is obtained;

thereby to confer a mousse-like texture and desirable pink coloration to said stuffing blend.

18. The method as claimed in claims 8 to 16, wherein said steam-cooked stuffed lobster is subsequently cooled by spray irrigation to the dorsal surface of said lobster;

thereby to effect rapid-cooling to avoid overcooking and thereby to maintain high quality and integrity to said lobster meat and to said stuffing.

19. The method as claimed in claims 6 to 18, wherein said preliminary vacuum aspiration of said anterior visceral cavity and said posterior intestinal tract is accompanied by said back-flushing with a dilute aqueous solution of lactic acid;

thereby to confer a bacteriostatic property to said eviscerated lobster.

20. The method as claimed in claim 19, wherein said lactic acid is used in a concentration range of 5 to 20 ml/L (w/w).

21. A stuffed, intact, whole, lobster in which the visceral and intestinal contents of said lobster have been removed, said lobster being filled with a stuffing comprising a raw blend comprising said female lobster roe and deep-shoulder section myotomal tissue from a lobster, or another lobster or other lobsters, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue.

22. The stuffed, intact, whole, lobster as claimed in claim 21, in the form of frozen said stuffed, intact, whole, lobster.

23. The stuffed, intact, whole, lobster as claimed in claim 21 or claim 22, in the form of initially cooked said stuffed, intact, whole, lobster which has been cooked at 100°C for a sufficient time to achieve an internal carapace temperature of at least 75°C to 85°C.

24. The stuffed, intact, whole, lobster as claimed in claim 23, in the form of a lobster which has been rapidly-cooled to effect rapid temperature removal, and finally which has been frozen.

25. The stuffed, intact, whole, lobster as claimed in claim 23, in the form of steam-cooked said stuffed, intact, whole, lobster.

26. The stuffed, intact, whole, lobster as claimed in claim 25, in the form of steam-cooked and spray-irrigated-cooled said stuffed, intact, whole, lobster.

27. The stuffed, intact, whole, lobster as claimed in claims 21 to 26, in which said stuffing comprises female lobster roe which has been manually-removed from a gravid female lobster and deep-shoulder section myotomal tissue from said lobster, or said

another lobster, or said other lobsters, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue.

28. The stuffed, intact, whole, lobster as claimed in claim 27, wherein the proportions of said female lobster roe and said deep-shoulder section myotomal tissue, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, are in the range of between 10% and 50% by weight of said female lobster roe and correspondingly between 90% and 50% by weight of said deep-shoulder section myotomal tissue.

29. The stuffed, intact, whole, lobster as claimed in claim 27 or 28, in which freeze-thaw stability and performance of cooked blended stuffing of said blend comprising female lobster roe and deep-shoulder section myotomal tissue recovered from a lobster, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, is ensured by providing said stuffing as a blend which also contains from 1% by weight to 10% by weight of a food grade starch.

30. The stuffed, intact, whole, lobster as claimed in claims 27 to 29, in which effective filling of said anterior visceral cavity with said stuffing is ensured to effect integuous contact between said stuffing and said contour of the inner shell surface and said region of abutment of said internal and anterior abdominal facets of said tail meat of said lobster by having said stuffing introduced into said anterior visceral cavity of said previously-eviscerated lobster by said oral intubation and said subsequent vibration to effect removal of said residual air.

31. The stuffed, intact, whole, lobster as claimed in claims 27 to 30, in which said stuffing blend comprising female lobster roe and deep-shoulder section myotomal tissue from a lobster, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, is in the form of a mousse-like texture

and a desirable pink coloration by having said stuffing steam-cooked until an internal temperature of between 75°C and 85°C is obtained.

32. The stuffed, intact, whole, lobster as claimed in claims 27 to 31, in the form in which overcooking is avoided and thereby in which high quality and integrity to said lobster meat and to said stuffing blend comprising female lobster roe and deep-shoulder section myotomal tissue recovered from a lobster, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, is maintained by having said steam-cooked stuffed lobster subsequently-cooled by spray irrigation to said dorsal surface of said lobster.

33. The stuffed, intact, whole, lobster as claimed in claims 27 to 32, in the form in which bacteriostatic property has been conferred to said eviscerated lobster by accompanying said vacuum aspiration of said anterior visceral cavity and said posterior intestinal tract by back-flushing with a dilute aqueous solution of lactic acid.

34. The stuffed, intact, whole, lobster as claimed in claim 33, wherein said lactic acid is used in a concentration range of 5 to 20 ml/L (w/w).

35. The stuffed, intact, whole, lobster as claimed in claims 27 to 34, in which said deep-shoulder section lobster meat, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, has been removed from said head-shell by vacuum aspiration under 15 inches of Hg. to 25 inches of Hg.

36. A stuffing for a stuffed, intact, whole lobster in which the visceral and intestinal contents of said lobster have been removed, said stuffing comprising a raw blend comprising female lobster roe and deep-shoulder section myotomal tissue from said lobster, or said another lobster or said other lobsters, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue.

37. The stuffing as claimed in claim 36, in which said stuffing comprises said female lobster roe which has been manually-removed from said gravid female lobster and said deep-shoulder section myotomal tissue from said lobster, or said another lobster, or said

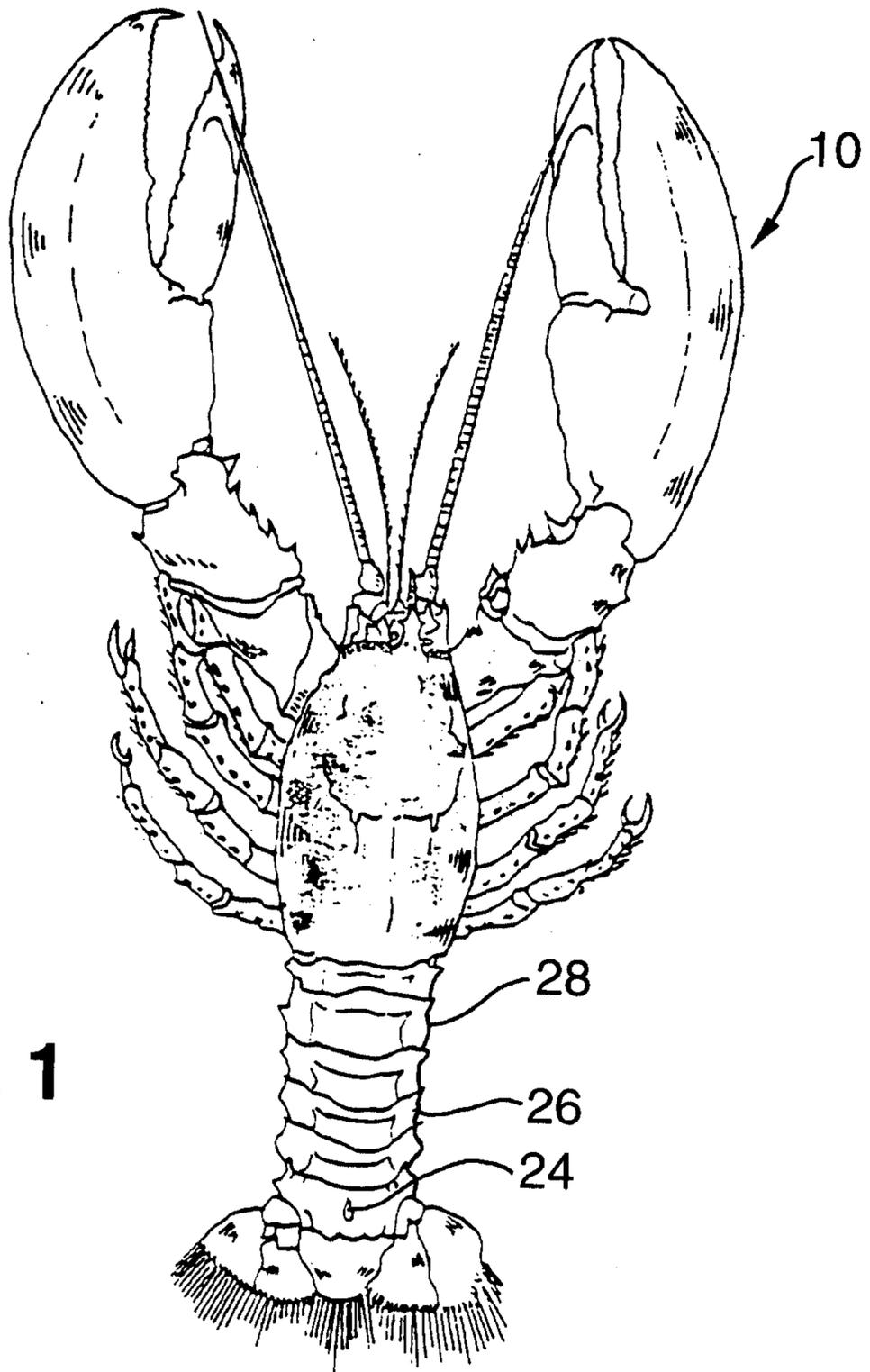
other lobsters, which has/have been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue.

38. The stuffing as claimed in claim 36 or claim 37, wherein the proportions of said female lobster roe and said deep-shoulder section myotomal tissue, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, are in the range of between 10% and 50% by weight of said female lobster roe and correspondingly between 90% and 50% by weight of said deep-shoulder section myotomal tissue.

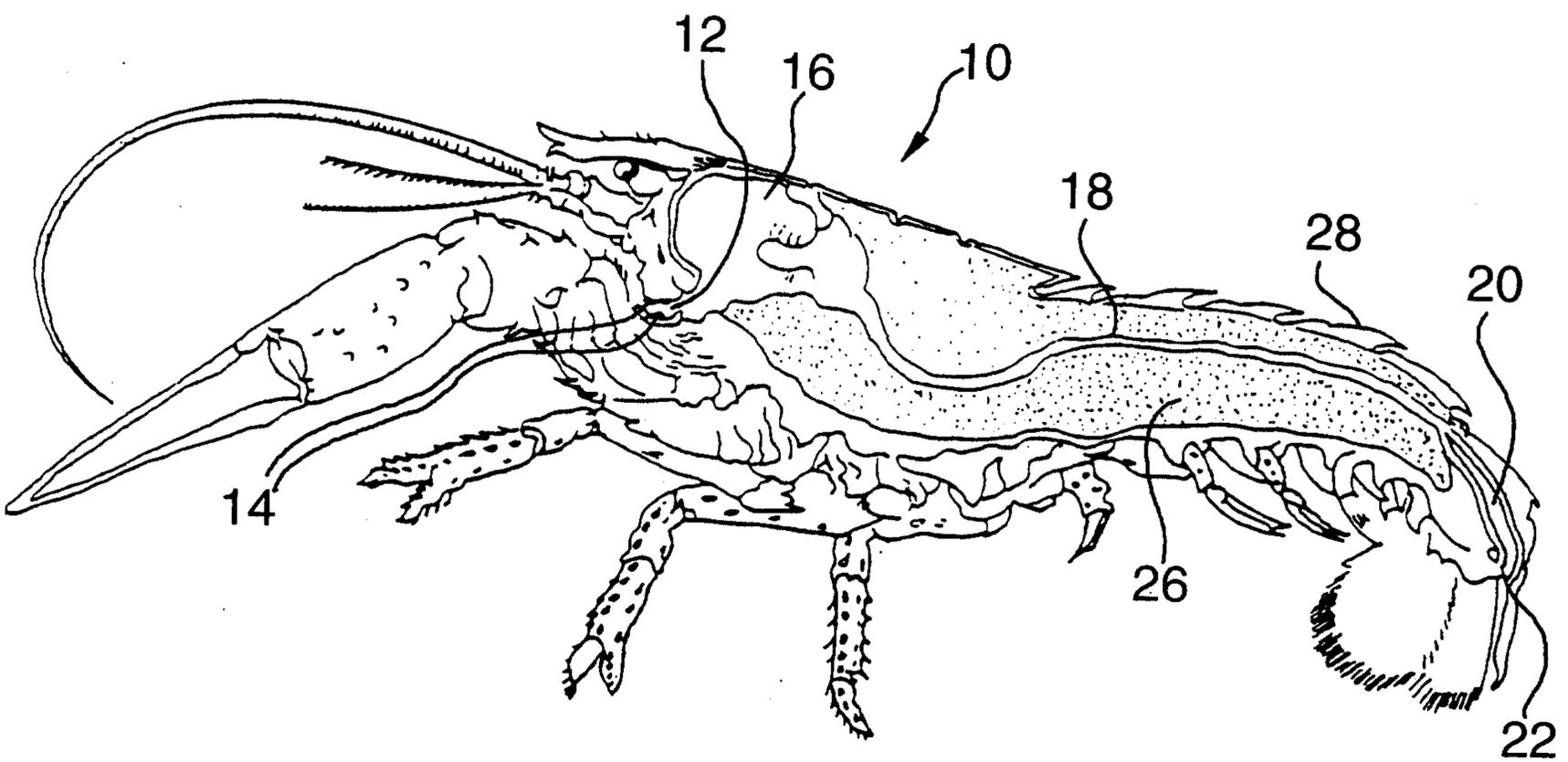
39. The stuffing as claimed in claims 36 to 38, comprising a blend comprising female lobster roe and deep-shoulder section myotomal tissue recovered from a lobster, which has been obtained by the steps of subjecting a head-shell of a lobster to at least one freeze/thaw cycle followed by vacuum aspiration to remove and to recover deep-shoulder section myotomal tissue, which also contains from 1% by weight to 10% by weight of said food grade starch, in order to ensure freeze-thaw stability and performance of said cooked blended stuffing.

40. The stuffing as claimed in claims 36 to 39, in the form of a mousse-like texture and a desirable pink coloration, which is provided by steam-cooking said stuffing until an internal temperature of between 75°C and 85°C is obtained.

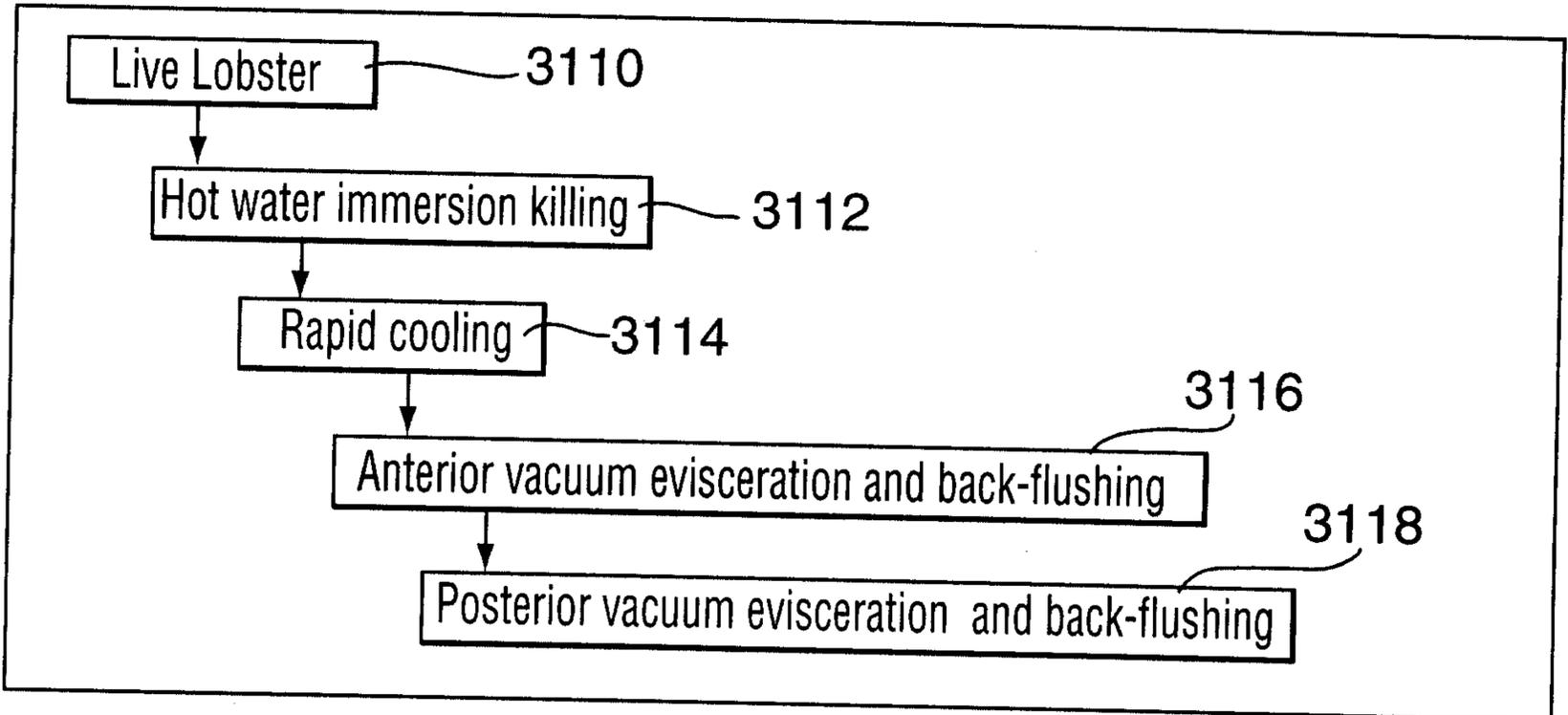
**FIG. 1**



**FIG. 2**



STEP (1)



STEP (2)

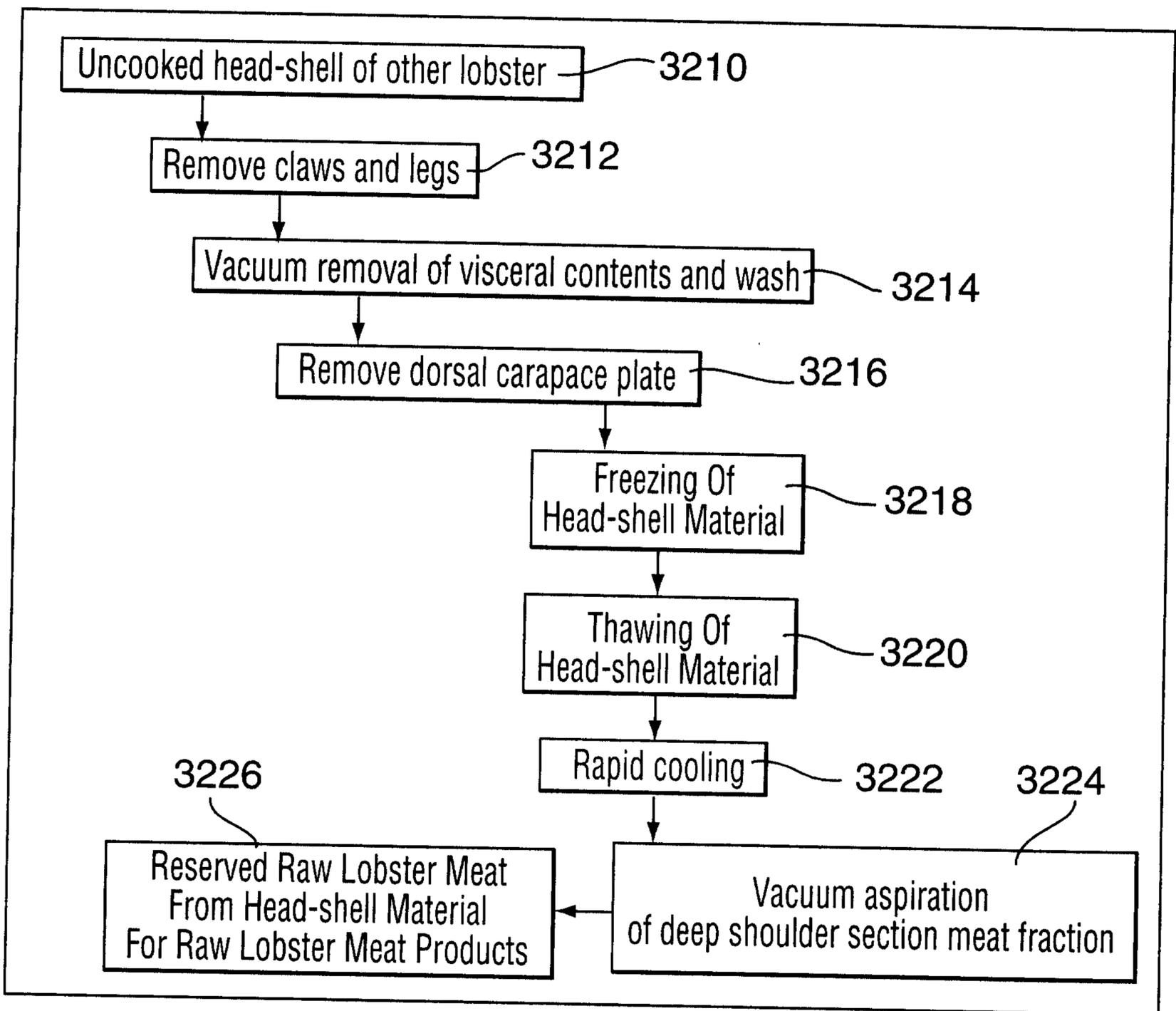
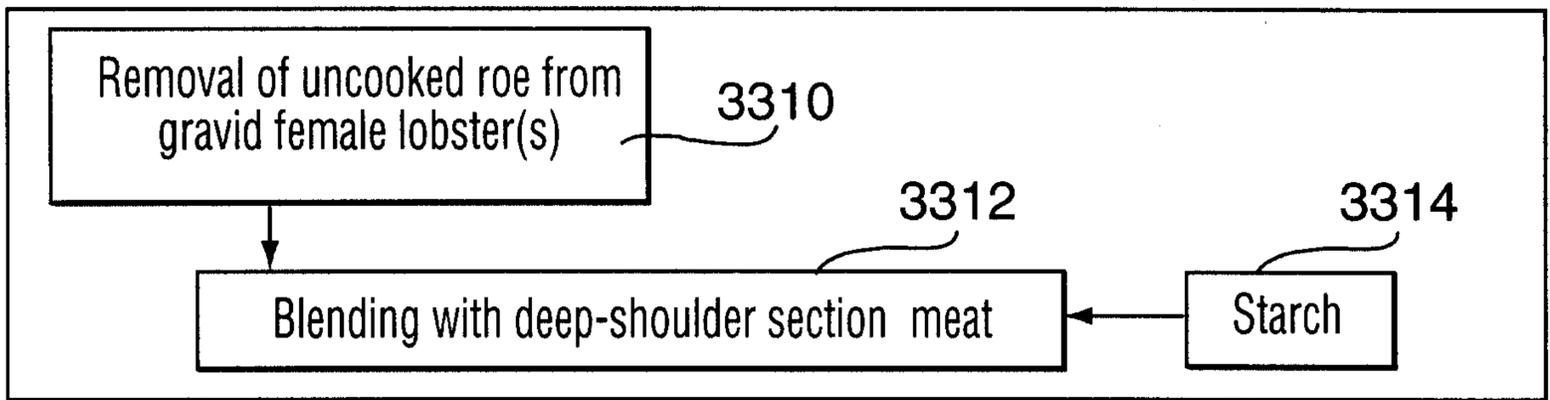
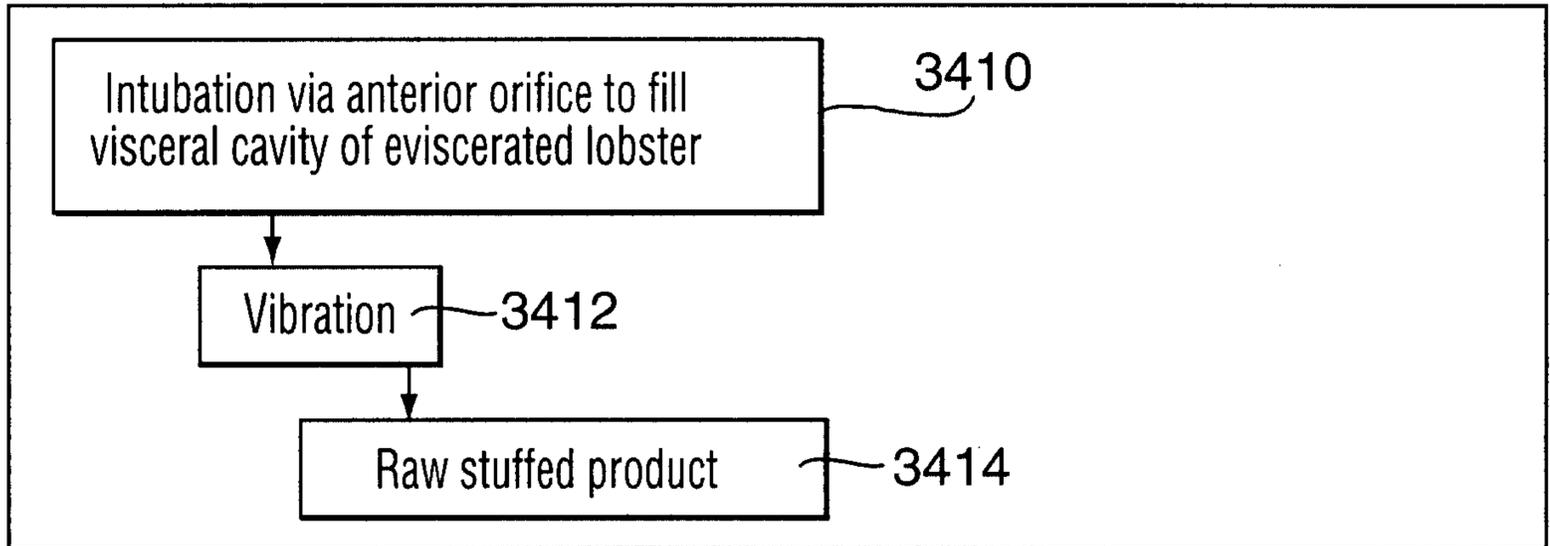


FIG.3A

STEP (3)



STEP (4)



STEP (5)

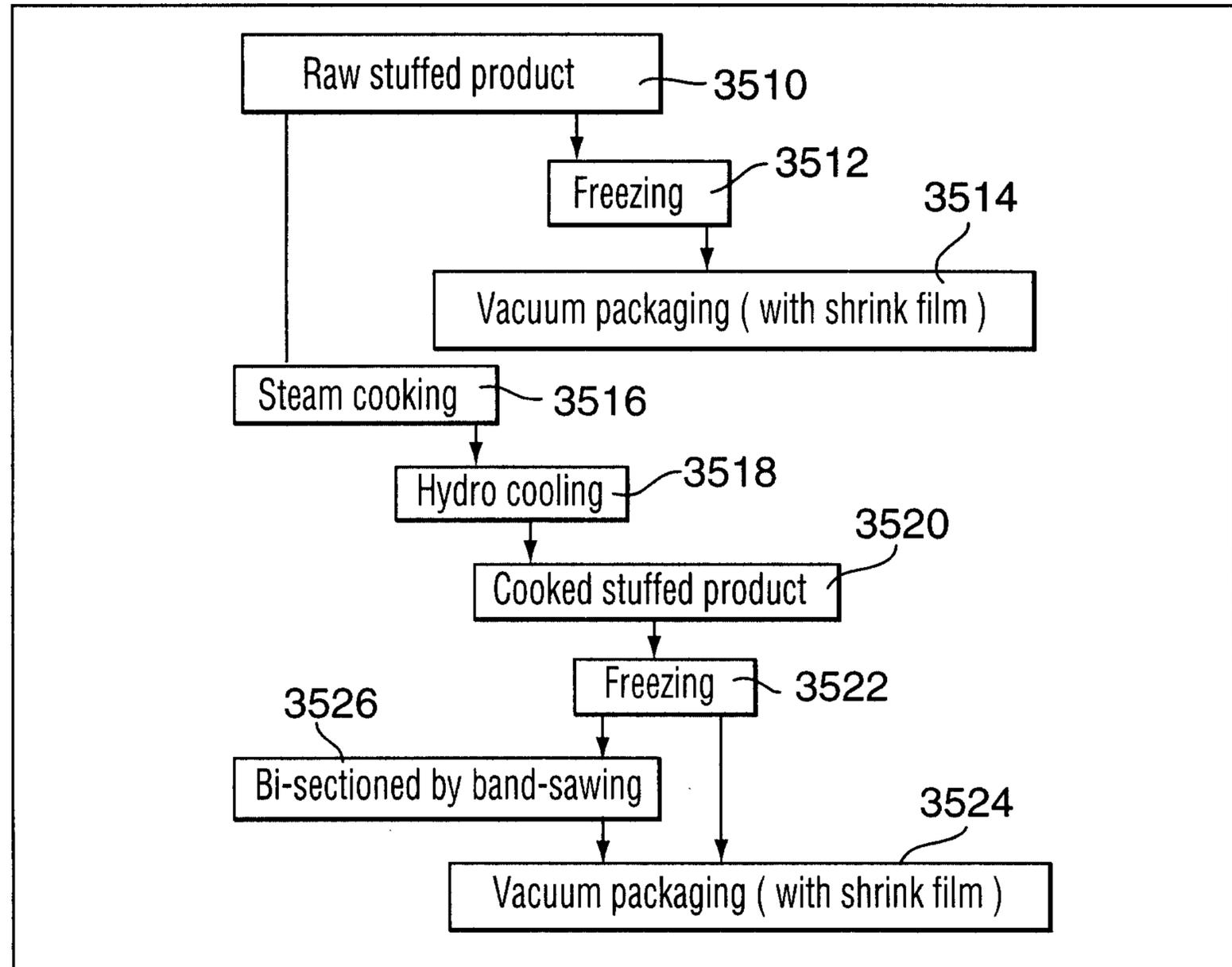
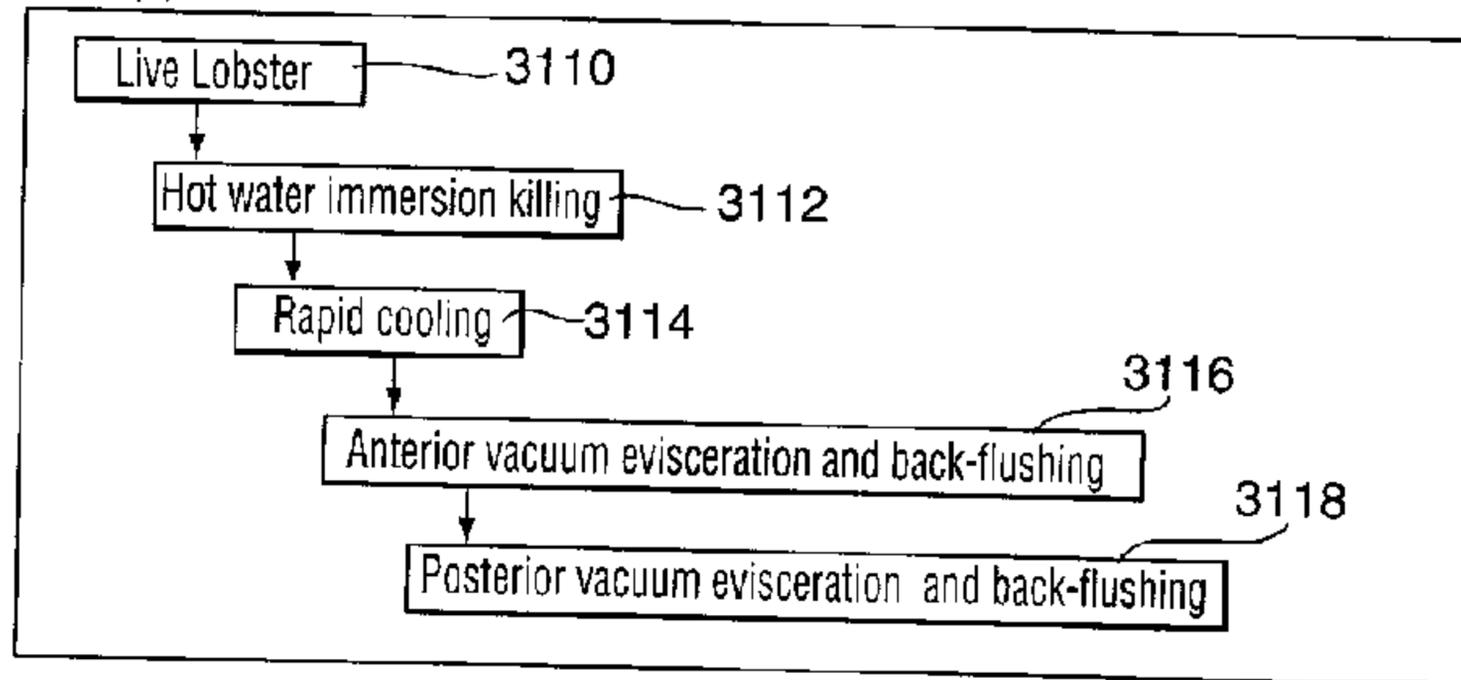


FIG.3B

STEP (1)



STEP (2)

