

COMMONWEALTH OF AUSTRALIA PATENTS ACT, 1952-1973
DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT

In support of the Convention Application No. made

(a) Here Insert (In full)
Name of Company.

by ^(a) STORK FIBRON B.V.

(hereinafter referred to as "Applicant") for a patent for an invention entitled:

(b) Here Insert Title of
Invention.

^(b) .. METHOD OF RECONSTITUTING MEAT PRODUCTS ..

(c) and (d) Here Insert
Full Name and Address
of Company Official
authorised to make
declaration.

^(c) Lambertus Gerardus Maria Klaassen ..

of ^(d) Eikenburglaan 23, 5248 BT ..

Rosmalen, The Netherlands ..

do solemnly and sincerely declare as follows:

1. I am authorised by Applicant to make this declaration on its behalf.

2. The basic Application(s) as defined by section 141 of the Act was/were made in ^(e) United Kingdom .. on the 8th .. day of .. March, .. 19 89

..... on the day of 19 ..

(e) Here Insert Basic
Country or Countries
followed by date or dates
of Basic Application(s).

(f) Here Insert Full
Name(s) of Applicant(s)
in Basic Country.

by ^(f) James William Leonard FRENCH and Lambertus Gerardus Maria KLAASSEN

(g) Here Insert (In full)
Name and Address of
actual Inventor or
Inventors.

3. ^(g) James William Leonard FRENCH ..

of ... Venta Silurum, Waterston, Dorchester, ..

Dorset BT2 7SZ, England .. is ~~not~~

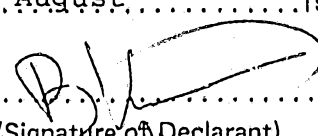
the actual Inventor(s) of the invention and the facts upon which Applicant is entitled to make the Application are as follows:

Applicant is the Assignee of the said Inventor(s) and of the said
Lambertus Gerardus Maria Klaassen.

4. The basic Application(s) referred to in paragraph 2 of this Declaration was/were the first Application(s) made in a Convention country in respect of the invention, the subject of the Application.

DECLARED at ... Rosmalen, The Netherlands ..
this ... 16th .. day of .. August .. 19 91

(h) Personal Signature
of Declarant (c) (no seal,
witness or legalisation).

^(h) ..  ..

(Signature of Declarant)

To THE COMMISSIONER OF PATENTS.

(L.G.M. KLAASSEN — DIRECTOR)

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- (57) A method is provided of reconstituting meat products which comprises mixing with a de-boned or separated meat (D or S meat), a fibrous collagen in order to distribute the added collagen substantially homogeneously throughout the D or S meat, removing occluded air and voids from the mixture and forming the mixture into discrete portions or a continuous extrusion by pressing the mixture through a restrictor. Normally between 1 and 10% of fibrous collagen is incorporated in the reconstituted meat product.

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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/GB90/00344 (22) International Filing Date: 7 March 1990 (07.03.90) (30) Priority data: 8905292.2 8 March 1989 (08.03.89) GB <i>see folio 9</i> (72) INVENTOR: (71) Applicant (for all designated States except U.S.): KLAASSEN, Lambertus, Gerardus, Maria [NL/NL]; Eikenburglaan 23, NL-5248 BJ Rosmalen (NL). (73) Applicant and Inventor: FRENCH, James, William, Leonard [GB/GB]; Venta Silurum, Waterston, Dorchester, Dorset BT2 7SZ (GB). (74) Agent: WOODCRAFT, David, Charles; Brookes & Martin, High Holborn House, 52-54 High Holborn, London WC1V 6SE (GB). (71) STORK FIBRON B.V. Industrielaan 63 OSS Netherlands.		(81) Designated States: AT (European patent), AU, BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), NO, SE (European patent), US. Published With international search report.  644586
(54) Title: METHOD OF RECONSTITUTING MEAT PRODUCTS (57) Abstract A method is provided of reconstituting meat products which comprises mixing with a de-boned or separated meat (D or S meat), a fibrous collagen in order to distribute the added collagen substantially homogeneously throughout the D or S meat, removing occluded air and voids from the mixture and forming the mixture into discrete portions or a continuous extrusion by pressing the mixture through a restrictor. Normally between 1 and 10 % of fibrous collagen is incorporated in the reconstituted meat product.		

METHOD OF RECONSTITUTING MEAT PRODUCTS

The present invention relates to a method of reconstituting meat and the improved products resulting therefrom.

5 De-boned or separated meat is obtained by de-boning carcasses after removal of meat cuts and the resulting de-boned or separated meat (hereinafter D or S meat) is conventionally added to higher quality meat, e.g. forequarter beef in the production of manufactured food
10 products such as beefburgers or canned meat or pie filling. There are, however, limitations in the amount of D or S meat which can be added to such meat products, primarily because the resulting mixed meat product has a rather poor structure and texture.

15 The present invention is based on the discovery that if fibrous collagen is introduced into the D or S meat under certain conditions, the resulting restructured product has enhanced properties including, particularly, texture which approximates to those of higher quality
20 meat cuts.

According to the present invention there is provided a method of reconstituting meat products which comprises mixing with a de-boned or separated meat (D or S meat), dried fibrous collagen in an amount of at least
25 about 1% by weight in order to distribute the added collagen substantially homogeneously throughout the D or S meat, removing occluded air and voids from the mixture and forming the mixture into discrete portions or a



continuous extrusion by pressing the mixture through a restrictor.

As is well known, collagen is a protein which forms the main constituent of connective tissue and is present
5 in higher proportions in tendons, bones and skin. Various commercial processes exist for recovering collagen from such sources, e.g. that described in U.S. Patent 2,979,438. Typically, the connective tissue, skin or bone is broken down mechanically and treated with an
10 aqueous salt-solution and/or enzymes to remove associated carbohydrates, fats and shorter chain proteins. Collagen exists in nature, together with accompanying fibrous proteins, such as elastin and reticulin, and generally such additional fibrous proteins are not removed in the
15 preparation of the fibrous collagen starting material of the present invention. After removal of carbohydrates, fats and shorter chain proteins as described above, the fibrous residue is dried at a temperature sufficiently low to avoid denaturing the proteins.

20 It is important for the purposes of this invention that the collagen is employed in a fibrous state. Commercially available collagen is generally supplied as a dried powder rather than as a fibre. In the performance of the process of this invention, fibrous
25 collagen having an average fibre length of from about 0.5 to 3 mm (typically about 1 mm) is preferred.



After separation of fats, carbohydrates etc. as described above, the raw collagen material is subjected to milling. At this stage, the collagen material normally has a water-content of 65 to 70%. The raw collagen material can be reduced to approximately pea size particles by mincing the wet product through an apertured plate having approximately 5 mm openings, e.g. using a Hobart mincer.

The minced raw collagen is then subject to drying in a controlled fashion. The drying temperature should be maintained below about 50-55°C., in order to avoid denaturing and case hardening the collagen. A fluidised bed dryer may be employed such as the shaking fluid bed dryer manufactured by Stork Friesland of Gorredijk, Holland. Prior to feeding the collagen material to the fluid bed dryer, it is agitated using a mechanical stirrer. A drying temperature in the fluidised bed of about 47 to 50°C is suitable. Drying is continued to a water-content of about 7 to 10%.

According to a further aspect the present invention provides a reconstituted meat product which comprises an intimate mixture of de-boned or separated meat (D or S meat), and at least 1% by weight of fibrous collagen.

The manufacture of the reconstituted meat products in accordance with the process of this invention is illustrated by the accompanying schematic drawing and following description.

The dried fibrous collagen is mixed with de-boned or

separated meat and preferably this mixing is carried out in a mixer/blender (1) of the horizontal paddle type, since such an apparatus best achieves an homogeneous dispersion of the fibres in the D or S meat. An example of a suitable paddle mixer is the model RS750 manufactured by Risco Brevetti S.p.A. of Zane, Italy. This machine comprises a trough and a pair of longitudinal shafts on which a series of inclined, interengaging paddles are mounted. The shafts may be rotated inwardly or outwardly, and in mixing the collagen into the D or S meat, the paddles are preferably rotated both inwardly and outwardly. The mixing can be carried out together with some added salt and water, although the amount of added salt should preferably be in the range of .5 to 1% by weight of the total mixture. The added water causes some degree of swelling of the collagen or associated gelatin which may be present in the collagen. This absorption of water gives the resulting product a juiciness which is not present in the original D or S meat. Preferably any added water should not constitute more than 20% by weight, and a preferred amount is 5 to 15% by weight. The de-boned or separated meat may include ground pork, lamb, beef, poultry or fish, including shellfish and the fibrous collagen may or may not be derived from the same species as the D or S meat. However, it is generally advantageous to use a collagen from the same species so that the resulting product can be labelled as meat from a single specified animal source.

The fibrous collagen is mixed in any desired proportions with the D or S meat. While there is no precise minimum amount of collagen fibres which should be mixed with the D or S meat, a significant improvement in texture and consistency of the resulting mix is not achieved unless a minimum of about 1% of collagen fibres is mixed with the D or S meat. There is no critical upper limit, although, generally speaking, addition of more than about 10% does not give rise to any further benefit. Preferred amounts of added collagen are in the range of 3 to 6%.

From the paddle mixer, which is preferably operated under vacuum, the mixture is transferred to a vacuum filler machine (2). This transfer can be made via a hopper as shown or transferred while held under vacuum. The vacuum filling machine (2) is of the kind which is used, e.g. for filling sausage casings and includes a piston which forces the mixture out of the filling machine through a tube 3 and into a restrictor 4. Any occluded air or voids in the mixture of collagen and D & S meat are removed in the vacuum filling machine. Restrictor 4 incorporates a tapered portion which tapers inwardly in the direction in which the mixture is forced into a portion forming machine 5. Machine 5 forms the mixed meat and collagen into portions e.g. by compression between shaped plates or by intermittent or continuous extrusion. The portion forming machine may be of the kind used for

forming hamburgers or meat patties. At this point, the portioned product may be packed into casings, e.g. sausage skins and/or transferred to a plate freezer 6 in which the portioned product is placed between cooled plates and rapidly frozen. After freezing the portions are held in a frozen food store.

The mixing temperature in paddle mixer 1 is preferably maintained at a minimum of about 6 to 7°C, preferably about 6 to 10°C, when there tends to be a release of myacin and other proteins, which is desirable. At this temperature there is little or no conversion of the collagen to gelatin. Temperatures in excess of 10°C should be avoided to limit any risk of bacterial development. Indeed the whole processing stage should be limited to a maximum of 10°C. In the initial mixing stage e.g. in the horizontal paddle mixer 1, the raw D or S meat may be mixed alone with the collagen fibres and the resulting product mixed subsequently with whole meat. Alternatively, whole muscle meat, such as forequarter beef, may be mixed in with the D or S meat and the collagen initially.

The properties of the restructured meat products are improved by forcing the product through a restrictor after compounding it in the vacuum filling machine. Generally, the restrictor should comprise an inwardly extending tubular passageway followed by a straight section or reverse tapered section, so that the compounded meat is subjected to an increased pressure followed by a gradual

release of pressure. During the pressing stage, during which the compounded product is forced out of the mixer, a pressure of 1 to 10 atmospheres gauge is preferably employed. The step of forcing the compounded meat out of the mixer and then controlling the release of pressure improves the texture and appearance of the product possibly as a result of some aligning of the collagen fibres.

Following the step of extruding the product from the vacuum filling machine, the restructured product is conveniently shaped and pressed into portions of desired size and stored under a maintained pressure. This can be achieved by freezing in a plate freezer or packing the product in a restraining packaging. This seems to have the effect of maintaining the desirable texture and binding properties of the product, possibly as a result of some continuing reaction during storage involving partial joining of the meat and collagen protein.

When subsequently cooked, there is a partial conversion of the collagen into gelatin which gives beneficial binding properties to the product in food manufacturing procedures. Gelatin or other edible binders may also be introduced into the product, preferably at the stage of mixing the collagen with the D or S meat.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A method of reconstituting meat products which comprises mixing with a de-boned or separated meat (D or S meat), dried fibrous collagen in an amount of at least about 1% by weight in order to distribute the added collagen substantially homogeneously throughout the D or S meat, removing occluded air and voids from the mixture and forming the mixture into discrete portions or a continuous extrusion by pressing the mixture through a restrictor.
2. A method according to claim 1 in which the mixing is conducted at a temperature of between about 6 and 10°C.
3. A method according to claim 1 or claim 2 in which occluded air is removed in a vacuum filling machine and the mixture forced through a restrictor.
4. A method according to claim 3 in which the restrictor comprises a tubular exit passage from the filling machine said exit passage tapering inwardly from said machine.
5. A method according to claim 3 in which the restrictor comprises a tubular exit passage which has a first portion which tapers inwardly and a second tubular portion which has a substantially uniform cross-section or tapers outwardly.
6. A method according to claim 4 or 5 in which the restrictor is arranged to feed the product to a machine for dividing it into portions and then freezing the



portions or packing them into casings.

7. A method according to any one of claims 1 to 6 wherein the fibrous collagen is dried to a water content of 7 to 10% by weight prior to mixture with the D or S meat.

8. A method according to any one of the preceding claims wherein the resulting mixture is cooked to form a coherent product having improved texture.

9. A reconstituted meat product which comprises an intimate mixture of de-boned or separated meat (D or S meat), and at least 1% by weight of fibrous collagen and which is in the form of compressed portions from which air has been substantially removed by vacuum processing, said collagen having been dried prior to admixture with the D or S meat.

10. A product according to claim 9 wherein the fibrous collagen is in the form of fibres having an average length of from about 0.5 to 3 mms.

11. A product according to claim 9 or 10 which contains about 3 to 6% by weight of fibrous collagen.

12. A product according to any one of claims 9 to 11 which additionally contains from 5 to 15% by weight of added water.

13. A product according to claim 9 wherein the fibrous collagen has a water content of 7 to 10% by weight.

14. Use of a fibrous collagen having a water content of 7 to 10% by weight and an average fibre length of from

-10-

0.5 to 3 mms as an additive to improve the texture of D
or S meat.

DATED this 28th day of September, 1993

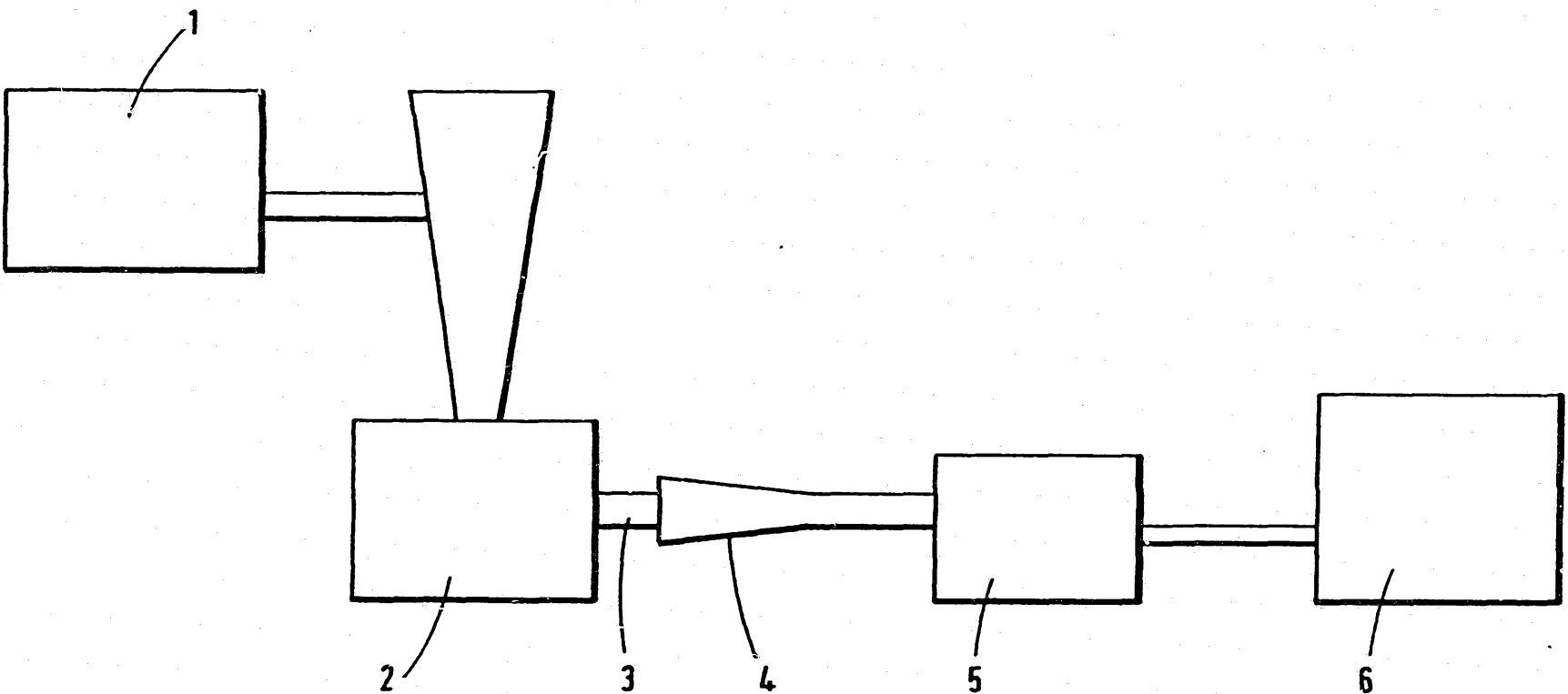
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SUBSTITUTE SHEET

International Application No. PCT/GB 90/00344

International Application No. PCT/GB 90/00344

Form PCT/ISA/210 (second sheet) (January 1985)

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
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	page 19, paragraph 4 - page 21, paragraph 4	
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A	Journal American Leather Chemists Association, (69), 1974, M. Komanowsky et al.: "Production of comminuted collagen for novel applications", pages 410-422 see page 410, paragraph 1 - page 411, paragraph 3	1
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**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

GB 9000344
SA 35082

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 30/05/90
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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