FORM 1

593645

REGULATION 9

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION FOR A STANDARD PATENT

We, BERNARD MATTHEWS PLC., a British Company of Great Witchingham Hall, Norwich, Norfolk, ENGLAND, hereby apply for the grant of a Standard Patent for an invention entitled:-

"MANUFACTURE OF MEAT-BASED PRODUCTS"

which is described in the accompanying Complete Specification.

Details of basic application:-

Number: 8613794

Country: U.K.

Date: 6th June, 1986

APPLICATION ACCEPTED AND AMENDMENTS ALLOWED 6-12-89

Our address for service is: SHELSTON WATERS
55 Clarence Street
SYDNEY, N.S.W. 2000.

DATED this 6th day of May, 1987

BERNARD MATTHEWS PLC

by P. Heathcote
Fellow Institute of Patent Attorneys of Australia
of SHELSTON WATERS

LODGED AT SUB-OFFICE
- 6 MAY 1987
Sydney

To: The Commissioner of Patents
WODEN A.C.T. 2606

File: D.B.47G

Fee: $160.00
MM

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PATENT OFFICE
LODGED AT SUB-OFFICE
6 MAY
Syd
ONE HUNDRED DOLLARS

PATENT OFFICE
SUB-OFFICE
SIXTY DOLLARS

(CONVENTION – Company) FORM 8 – REGULATION 12 (2)

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 by [a] BERNARD MATTHEWS PLC .....

.....

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

[b] "MANUFACTURE OF MEAT-BASED PRODUCTS" .....

.....

.....

I, [c] JOHN GRANGER BROWN .....

.....

of [d] BERNARD MATTHEWS PLC, Great Witchingham Hall, .....

Norwich, Norfolk, England .....

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] the United Kingdom ....on the 6th day of June .....19 86

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

by [f] BERNARD MATTHEWS PLC .....

3. [g] BERNARD TREVOR MATTHEWS, a British Subject of Great Witchingham Hall, Norwich, Norfolk, England; DAVID JOHN JOLL a British Subject of Southlands, Cromer Road, High Kelling, Holt, NORFOLK, England; HABEEB MOHAMED ZIAUDDIN, a British Subject of 'Omar', The Street, Taverham, Norwich, Norfolk, England and DAVID NORMAN WILSON, a British Subject of 'Syringa' Pond Lane, Drayton, Norwich, Norfolk, England is/are

of .....

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).

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 .....NORFOLK, ENGLAND.....

this .....16TH.....day of .....APRIL.....19 87

[h] J. G. B.

.....

(Signature of Declarant)

(J.G.BROWN)

To THE COMMISSIONER OF PATENTS.

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

(b) Here Insert Title of Invention.

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

(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.

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

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

**SHELSTON WATERS**
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(12) PATENT ABRIDGMENT (11) Document No. AU-B-72551/87
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 593645

(54) Title
REFRIGERATION IN MEAT PRODUCT MANUFACTURE

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SHELSTON WATERS

(56) Prior Art Documents
AU 452157 59561/69 10.8; 10.7
AU 451940 13661/70 10.8; 10.7
AU 475294 49706/72 10.7; 35.4

(57) Claim

1. A process for the production of an evenly cooled comminuted mass of granular meat ready for forming which comprises the steps of discharging as a thin layer a primary comminute of meat granules onto a moving refrigerated surface to substantially contact each granule with the surface thereby bringing all granules to a similar mean temperature, removing said layer from the surface as a coherent strip and converting the said strip by a secondary comminution operation with a reduction of granules size into the evenly cooled mass.

2. A process as claimed in Claim 1 wherein the layer on the refrigerated surface is of the order of one granule thick.

6. Apparatus for carrying out a process as claimed in any of the preceding claims such apparatus comprising a primary comminution device feeding onto a nip at the surface of a drum freezer or equivalent, means for detaching a frozen strip from the surface of the freezer, a discharge conduit from the detaching means to a secondary commminution device and discharge means from the secondary comminution device.

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COMMONWEALTH OF AUSTRALIA

FORM 10

PATENTS ACT 1952

COMPLETE SPECIFICATION

FOR OFFICE USE:

Class Int.Class

Application Number: 72551/87
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority:

Related Art:

This document contains the amendments made under Section 49 and is correct for printing.

Name of Applicant: BERNARD MATTHEWS PLC

Address of Applicant: GREAT WITCHINGHAM HALL,
NORWICH, NORFOLK
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Actual Inventor: BERNARD TREVOR MATTHEWS, DAVID JOHN JOLL,
HABEEB MOHAMED ZIAUDDIN AND
DAVID NORMAN WILSON

Address for Service: SHELSTON WATERS, 55 Clarence Street, Sydney

Complete Specification for the Invention entitled:

"MANUFACTURE OF MEAT-BASED PRODUCTS"

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

# Manufacture of Meat-Based Products

## DESCRIPTION

This invention is concerned with the manufacture of meat-based products formed by compaction, for example moulding or extrusion, of comminuted meat, possibly mixed with other edible material.

It is important in the manufacture of such products to have the comminuted meat at a suitably cold temperature for forming. A mass of comminuted meat starts to freeze solid at a temperature in the region of $-2^{o}C$. The mass is frozen solid at or around $-8^{o}C$ so at temperatures between -2 and $-8^{o}C$, the freezing process is taking place and the latent heat of freezing is being extracted from the system. Thus the meat mass is relatively stable, so far as temperature is concerned, in this zone and, moreover, latent heat phenomena assist in the effective

compaction. For convenience we will refer to a meat mass in this temperature range, the desired for compaction, as being in the "latent zone" and an objective of an effective process is to produce a meat mass evenly cooled to this latent zone.

Current practice in the meat industry in the production of granular comminutes for forming is to cause or allow meat initially frozen solid and in large pieces to cool, or "temper" to the temperature required for forming. The suitably tempered meat is then comminuted into a cool mass. This tempering requires considerable skill and is liable to inconsistencies in forming as it is difficult to achieve a uniform temperature in the comminute. Lack of uniformity of temperature gives rise to variation in texture and density in the compacted product.

In accordance with the present invention meat particles, a primary comminute, are discharged as a thin layer onto a moving refrigerated surface. The layer is preferably approximately one granule thick so that, at least so far as is practically possible, each and every granule is contacted by the refrigerated surface and thereby substantially every granule is brought to a similar calorific value ie. mean temperature. The thin layer travelling along the surface is converted by the freezing process to a coherent strip of compacted granules

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and this strip is subject to a further comminution operation to reduce granule size and to produce an evenly cooled mass of meat particles ready for forming.

The strip removed from the refrigerated surface is made up of granules each of substantially the same mean temperature, there being a temperature gradient within each granule from the inner surface which contacts the refrigerated surface to the outer surface. During the further comminution the granules are reduced in size and mixed and the evenly cooled mass is achieved.

This evenly cooled mass of comminuted meat ready for forming has a temperature within the desired latent zone so is reasonably temperature-stable and may be taken immediately for compaction or stored in a chilled room.

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The freezing to the thin layer may conveniently be carried out on the surface of a drum freezer. In a drum freezer a large diameter drum with a refrigerated surface rotates slowly about a horizontal axis. Material to be froze is fed onto the upper part of the drum, sticks to the drum by surface freezing and is transported about an arc by movement of the drum. When frozen the product is detached as a coherent pliable strip. Preferably the desired layer thickness is achieved by feeding the primary comminute from a suitable manifold into a nip between the freezer drum and a contra-rotating roller.

US Patent No. 4,098,095 discloses a refrigeration apparatus based on a drum freezer. A viscous protein-based and non-granular paste is frozen on the surface of the roller into a strip, which strip may be chopped for transporting or unspecified further processes. US Patent No. 4,192,899 discloses a drum freezer used for freezing ground meat. Meat patties are stamped out of the frozen strip emerging from the drum.

The characteristic feature of the present invention is the use of the drum to freeze each granule of a primary comminute to an even mean temperature, substantially immediately followed by a second comminution, which reduces the granules to the desired size and equalises the temperature in the mass of granules.

The invention will now be described by way of example and with reference to the accompanying schematic drawings wherein:-

Figure 1 is a diagram of apparatus putting the invention into effect;

Figure 2 is a plan view along the line B of a strip of frozen granules emerging from the drum; and

Figure 3 is a cross-section, partly diagrammatic, on the line III - III showing a section of the strip of granules on the periphery of the drum.

Referring initially to Figure 1 of the drawings a primary comminution device is indicated at 1. Large pieces of fresh meat 2 are the primary input to the process. "Fresh meat" as the term in understood in the meat industry arrives from specialist suppliers at approximately 0°C. (All temperatures specified will be mean temperatures unless otherwise stated). During handling this temperature rises somewhat. The large

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pieces of fresh meat are subjected to a primary comminution in device 1 to produce relatively large granules $P_1$ having a diameter in the embodiment being described approximately 2cm. This primary comminution can, for example, be achieved by driving the large pieces through a multi-apertured plate. Any appropriate known comminution process can, however, be used. The granules $P_1$ pass through pipe 3 into hopper 4 and from thence are driven upwardly through pipe 5 by pump 6 to be discharged downwardly into the surface of the drum freezer. The granules after this initial handling and primary comminution and other processing have a temperature in the region of +8 to +19°C.

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The pipe 5 discharges downwardly (in a realised embodiment probably as a two-nozzle manifold) into the nip 8 between slowly rotating drum freezer 7 and a contra-rotating roller 9. The drum freezer, of proprietary construction, has a diameter of the order of 3 metres and is approximately 1 metre in axial length. The drum freezer contains a freezing annulus producing a surface temperature of the order of $-30^{\circ}C$. The nip 8 is so dimensioned as to achieve, so far as it is possible a layer 10 of primary comminute on the drum of the order of one granule thick. Figure 3 illustrates this condition, idealised, with the particles slightly flattened by the nip. The primary particles are fed onto the freezer drum through the nip as a fluid and the layer 10 remains stuck by freezing on the cold drum surface for a period determined by the speed of rotation and the angular position of the stripping blade 11. The speed of rotation in the sense of arrow A is approximately one third of a revolution per minute and the layer 10 adhering to the surface of the roller goes round approximately $300^{\circ}$ to the stripping blade 11 which contacts the surface of

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the roller to divert and remove the layer from the drum 7 onto a downwardly inclined chute 12.

During its period of contact with the drum the physical form of the layer 10 is changed from the fluid to a frozen and partially compacted strip with the physical form generally similar to that of cardboard. That is to say the strip is stiff enough to maintain coherence and integrity but sufficiently pliable to be despatched and discharged into the chute without fracturing. Figure 2 is a plan and partially diagrammatic view of the strip 10 in the chute.

Referring to Figure 3 the idealised representation of the granules shows them cohered together at a location just before separation from the drum. At this stage each granule has its inner peripheral region in contact with the surface of the drum at approximately -30°, being the drum surface temperature. The outer periphery has the temperature decreased much less say to +4°C. Thus each and every granule P has a substantially even mean temperature and a temperature gradient from inside to out of the order of 34°C. The strip 10 of granules thus cooled descends the short chute 12 under the drive of the drum straight into a secondary comminuting device 13 which reduces the granule size by half to approximately 1 cm. During the blending which inevitably accompanies this comminution the temperature of the overall mass of

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granules is equalised so that a consistent even mean temperature of the order of -4°C is achieved. This is within the desired latent zone. The secondary comminution device may be of known type corresponding to the granule size reduction to be achieved. A suitable device is based on a screw mincer preceded by a rotating vaned shaft.

The reduced and finally comminuted granules $P_2$ are discharged from the secondary comminuter 13 for further processing. As illustrated the granules are discharged through outlet pipe 14 into a trolley 15 which may be taken away for more or less immediate use, not more than 30 minutes dwell, into a forming device of a known type; patties and substitute meat cuts may be shaped in a known manner.

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Alternatively the trolley can be taken to a chill room held at $-4^{\circ}C$ where it remains in its stable and evenly frozen state. A further possibility is to integrate the discharge nozzle 14 by means of suitable piping with a forming device so that a totally integrated process of dealing with large pieces through primary and secondary comminutes onto a forming device is achieved.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A process for the production of an evenly cooled comminuted mass of granular meat ready for forming which comprises the steps of discharging as a thin layer a primary comminute of meat granules onto a moving refrigerated surface to substantially contact each granule with the surface thereby bringing all granules to a similar mean temperature, removing said layer from the surface as a coherent strip and converting the said strip by a secondary comminution operation with a reduction of granules size into the evenly cooled mass.

2. A process as claimed in Claim 1 wherein the layer on the refrigerated surface is of the order of one granule thick.

3. A process as claimed either Claim 1 or Claim 2 wherein the refrigerated surface is the surface of a drum freezer.

4. A process as claimed in any of the preceding claims which includes the step of forming the primary comminute from large pieces of fresh meat and discharging through appropriate piping said primary comminute onto the moving surface.

5. A process as claimed in Claim 4 wherein the primary comminute is discharged onto said surface through the nip

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between a rotating freezer drum and a contra-rotating roller.

6. Apparatus for carrying out a process as claimed in any of the preceding claims such apparatus comprising a primary comminution device feeding onto a nip at the surface of a drum freezer or equivalent, means for detaching a frozen strip from the surface of the freezer, a discharge conduit from the detaching means to a secondary commminution device and discharge means from the secondary comminution device.

DATED this 17th day of November, 1989.

BERNARD MATTHEWS PLC.

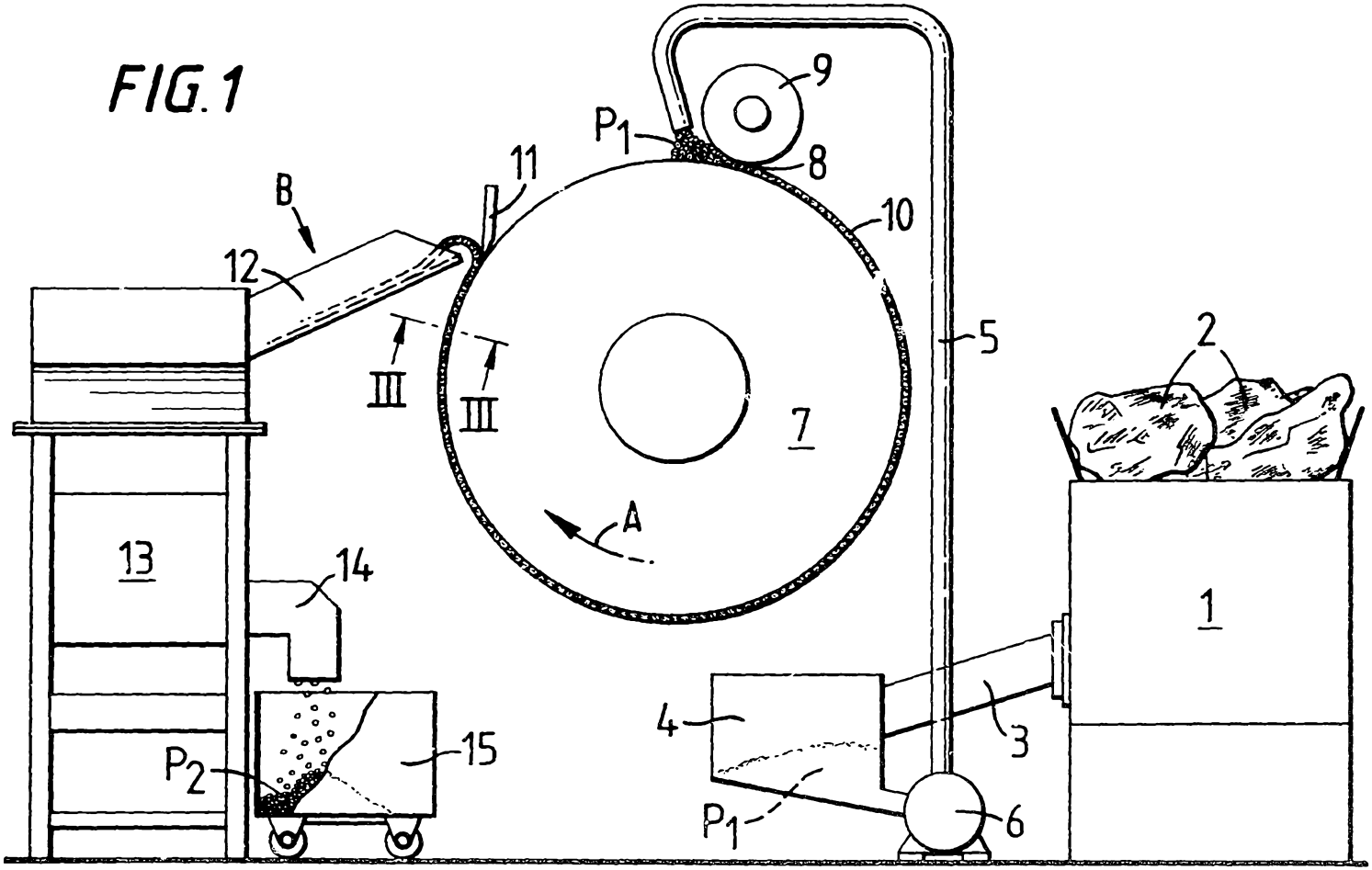
Attorney: WILLIAM S. LLOYD

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FIG. 1




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FIG. 2

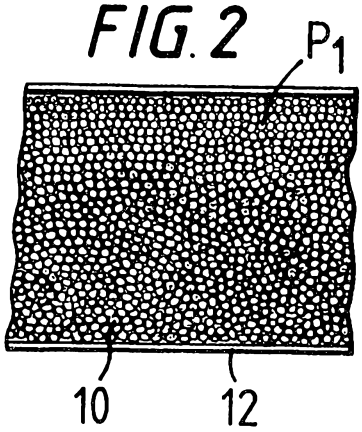



FIG. 3

