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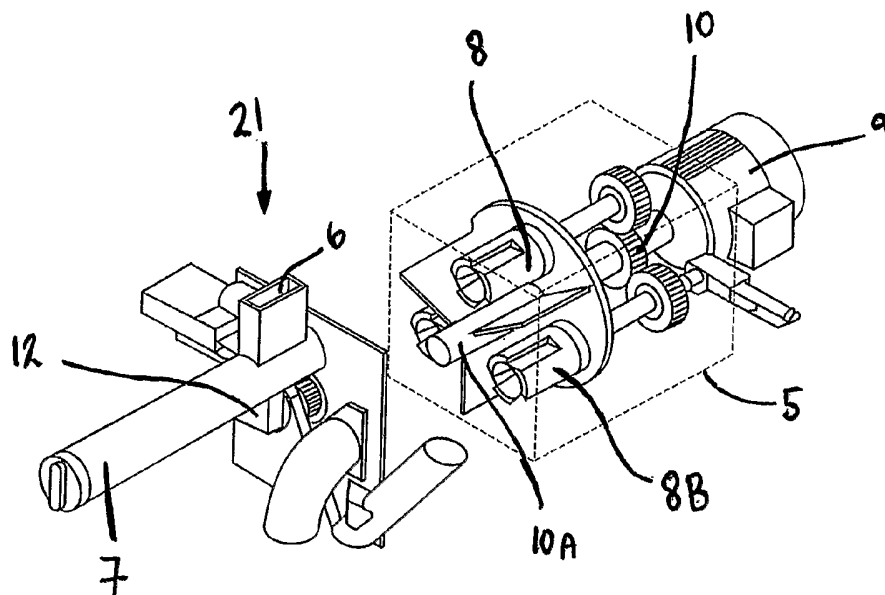
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(54) Title: PRODUCE SHAPING, APPARATUS THEREFOR AND USES THEREOF



(57) Abstract: The apparatus and method shaves produce such as carrots to a uniform style capable of being packaged. The apparatus has shavers arrayed about the rotational axis of, yet carried by, a carousel, each having at least one blade rotatable about its associated rotational axis substantially parallel to but spaced outwardly of the rotational axis of the carousel. A magazine or hopper or robotic fed product stuffer is adapted to drive a produce item for shaving into an indexed shaver for shaving of that produce item as the shaver but not the carousel is drivingly rotated. A product ejection arrangement is to act on the shaven and crowned product whilst the shaver still supports the product to remove the product in a direction opposite its stuffing direction.



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PRODUCE SHAPING, APPARATUS THEREFOR AND USES THEREOF**FIELD OF THE INVENTION**

The present invention relates to produce shaping apparatus and uses thereof to
5 provide products (being preferably shaped root or bulbous vegetable products typified
by but not restricted to derived from carrots, parsnips and beetroot).

The present invention relates to root or bulbous vegetables typified by but not
restricted to carrots, parsnips and beetroot.

Frequently growers will encounter a grading regime for their produce which
10 precludes from some market destinations a significant part of their crop. Frequently
they also encounter retailer or customer resistance owing a perceived need for ender
user preparation (e.g. trimming, etc.). It is to this that the present invention is
directed.

The present invention involves or has as an object a procedure whereby produce
15 insofar as appearance, exterior configuration or the like can be modified by a peeling
or shaving process (as opposed to abrasive tumbling or erosion) to produce a
substantially uniform product capable, if desired, of being sterile packed and sold for
use.

The present invention involves a procedure whereby products not up to a
20 standard insofar as appearance, exterior configuration or the like can be modified to
produce a substantially uniform product capable of being sterile packed and sold for
use.

The present invention has as an alternative object apparatus and methods of use
of such apparatus useful for shaping products (preferably in a substantially uniform
25 manner) irrespective of whether or not the source material from which the products
have been shaped are up to a marketable standard or not.

BRIEF DESCRIPTION OF THE INVENTION

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In a first aspect the present invention consists in **apparatus for shaping as products produce items** (such as a carrots), said apparatus comprising or including

a carousel having a rotational axis,

a series of produce item shavers arrayed about the rotational axis of, yet carried
5 by, the carousel, each having at least one blade rotatable about its associated rotational axis substantially parallel to but spaced outwardly of the rotational axis of the carousel,

a drive for each produce item shaver to rotate each about its rotational axis,

a carousel rotation and indexing arrangement to rotate the carousel about its rotational axis to serially present stations to the produce shavers,

10 a magazine or hopper or robotic fed product stuffer to drive a produce item for shaving into an indexed and stuffing stationed shaver for shaving of that produce item as the shaver but not the carousel is drivingly rotated,

a product crowner to act on the recently shaven produce item at a station at which the shaver is indexed, other than the stuffing station, whilst still supporting its
15 shaven product, and

a product ejection arrangement (e.g. a fluid flow) to act on the shaven and crowned product whilst the shaver still supports the product to remove the product in a direction opposite its stuffing direction.

In a further aspect the present invention consists in **apparatus for shaping a**
20 **product** (from produce such as a carrot), said apparatus comprising or including

a carousel having a rotational axis,

a series of produce shavers arrayed about the rotational axis of, yet carried by, the carousel, each shaver having at least one blade rotatable about its rotational axis substantially parallel to, but spaced outwardly of, the rotational axis of the carousel,

25 a drive for each produce shaver to rotate each about its rotational axis,

a carousel rotation and indexing arrangement to rotate the carousel about its rotational axis to serially present machine functions to the produce shavers,

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a magazine or hopper or robotic fed product stuffer to drive produce for shaving into an indexed shaver for shaving as the shaver is drivingly rotated,

a product crowner to act on a shaven produce item whilst its shaver is still supporting the shaven produce, and

- 5 a product ejection arrangement (e.g. a fluid flow) to act on the shaven and crowned produce whilst the shaver still supports the produce to remove the produce as a shaven and crowned product in a direction opposite its stuffing direction.

In still a further aspect the present invention consists in **a method of shaping a product from product** (e.g. such as a carrot), said method comprising or including

- 10 feeding a feedstock of the produce, one item at a time, longitudinally into a dedicated shaver carried by a carousel and shaping the produce by shaving whilst holding the produce relatively still in the shaver as at least one blade the shaver rotates about the axis of the longitudinal item,

- 15 crown shaping a larger end of each shaven produce whilst it is still supported by its shaver, and

ejecting each shaped and crowned product from the shaver.

Preferably each crowing and ejection step for a particular produce item occurs at a different rotational position (e.g. optionally at stations) of the shaver about the rotational axis of the carousel.

- 20 Preferably produce item feed into its shaver is under the action of a ram from a magazine or the like.

Preferably the crowning is by a ram supported produce item reliant on rotation of the blade(s) of the shaver relative to the produce (whether the produce itself is cause to rotate by the shaver or the blade is rotated, or both).

- 25 Preferably the ejection is under the action of a fluid flow.

Preferably the method is performed substantially as hereinafter described with reference to any one or more of the accompanying drawings.

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In still a further aspect the present invention consists in a method of the present invention when performed using apparatus of the present invention.

In another aspect the present invention consists in a **method of preparing a root or bulbous vegetable** (e.g. carrot, parsnip, beetroot or the like), said method
5 comprising or including

(optionally) pre-sizing vegetables of the same kind to provide a sufficient feedstock thereof (“feedstock form”),

mechanically shaping the feedstock form using apparatus of the present invention to a predetermined product form and product size (“the product form”), and

10 creating a sterile package that includes the product forms.

Preferably the creation of the sterile package involves both a sterilization step for the shaped product forms as well as the packaging thereof.

Preferably said vegetables are carrots and (i) the pre-sizing is by (preferably by one or both) topping and tailing and/or (ii) the predetermined form and size is to a
15 predetermined length and girth of a simulated carrot form.

Preferably each said product shaver is a substantially conical or frustoconical shaver that performs in a manner similar to a pencil sharpener with the feedstock carrot being stuffed into the shaver to a uniform extent and being so held so as to provide a shaving relativity of rotational movement therein.

20 Preferably the shaver rotates and the carrot does not, or *vice versa*.

Preferably a ram drives each feedstock carrot of predetermined length in a predetermined distance into the shaver.

Preferably such a ram feeds a feedstock form from a magazine thereof.

Preferably each shaped carrot is discharged from the shaving apparatus from the
25 larger end thereof under the action of a fluid (e.g. air or water) introduced from the other end.

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In another aspect the present invention consists in **a method of providing a carrot product which is a predetermined carrot simulating form and a substantially predetermined reduced size**, said method comprising or including

(optionally) cutting a carrot to length to provide a feedstock carrot of a
5 predetermined length and a girth beyond that desired,

feeding each such feedstock carrot into a shaver of apparatus of the present invention, said feeding being a mechanical feed of the carrot into the shaver and shaping the carrot,

crown shaping of the still shaver supported carrot using a product crowner, and
10 removing the thus sized and shaped carrot form from such shaving apparatus prior to the

infeed of a subsequent feedstock carrot there into.

Preferably said method includes in addition sterilizing and packing such carrot forms in a sterile pack.

15 In some forms of the present invention a preservative, composition, solution, etc. can be associated with the carrot forms in the pack.

In yet a further aspect the present invention consists in **a carrot or other produce of a shaped form** that is the result of the use of apparatus or a method of the present invention.

20 The present invention also consists in **any shaped foodstuff** that has been shaped using a method or apparatus of the present invention.

In another aspect the present invention consists in **a method of preparing a root or bulbous vegetable** (e.g. carrot, parsnip, beetroot or the like), said method comprising or including

25 pre-sizing vegetables of the same kind to provide a sufficient feedstock thereof ("feedstock form"),

mechanically shaping the feedstock form to a predetermined product form and product size ("the product form"), and

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creating a sterile package that includes the product forms.

Preferably the creation of the sterile package involves both a sterilization step for the shaped product forms as well as the packaging thereof.

Preferably said vegetables are carrots and (i) the pre-sizing is by (preferably
5 both) topping and tailing and/or (ii) the predetermined form and size is to a predetermined length and girth of a simulated carrot form.

Preferably step (i) and/or step (ii) are (is) machine automated.

Preferably the shaping step is performed by serially presenting a number of the pre-sized feedstock carrots to a shaping apparatus.

10 Preferably said shaping apparatus is a substantially conical or frustoconical shaver that performs in a manner similar to a pencil sharpener with the feedstock carrot being machine feed into the shaver to a uniform extent and being machine held so as to provide a shaving relativity of rotational movement therein.

Preferably where a top and tailed carrot or the like is over girth for the shaver it
15 has been either excluded or trimmed in its girth to allow entry fully into the shaver.

Preferably the shaver rotates and the carrot does not, or *vice versa*.

Preferably a ram drives each feedstock carrot of predetermined length in a predetermined distance into the shaver.

Preferably such a ram feeds a feedstock form from a magazine thereof.

20 Preferably each shaped carrot is discharged from the shaving apparatus from the larger end thereof under the action of air introduced from the other end.

In another aspect the present invention consists in **a method of providing a carrot product which is a predetermined carrot simulating form and a substantially predetermined reduced size**, said method comprising or including

25 cutting a carrot to length to provide a feedstock carrot of a predetermined length and a girth beyond that desired, and

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feeding each such feedstock carrot into a shaver, said feeding being a mechanical feed of the known length feedstock carrot a predetermined distance into the shaving apparatus and

removing the thus sized and shaped carrot form from such shaving apparatus
5 prior to the infeed of a subsequent feedstock carrot there into.

Preferably said method includes in addition sterilizing and packing such carrot forms in a sterile pack.

In some forms of the present invention a preservative, composition, solution, etc. can be associated with the carrot forms in the pack.

10 In yet a further aspect the present invention consists in **a carrot form** that is the result of topping and tailing a carrot and shaving the truncated carrot form to a carrot simulating form of lesser girth.

In a further aspect the present invention consists in **a sterile packed carrot form** being a reduced size and girth carrot simulating form as previously mentioned.

15 The present invention also consists in **any shaped foodstuff** that has been shaped using a method or apparatus of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred form of the present invention will now be described with reference to
20 the accompanying drawings in which

Figure 1 shows in broken outline the perimeter of a shrink wrap sterile packaging pack in which a few products in accordance with the present invention have been packed, such products each being a reduced form of a carrot or the like product larger form,

25 **Figure 2** shows an alternative array in a pack,

Figure 3A shows a typical vegetable form where removal of the distal ends is conducted at the dotted lines.

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Figure 3B shows a preferred shaver in accordance with the present invention showing the generally conical form thereof which complements the angled cutter thereof,

Figures 4 to 6 show preferred apparatus in accordance with the present invention, the depictions being substantially similar but allowing an explanation of the sequencing of operation as the carousel rotates thereby carrying from one functional station to another the carrot or other produce carried by its shaver.

Figures 7 shows a preferred flow diagram of the present invention,

Figure 8A through 8E shows a preferred method of operation of apparatus in accordance with the present invention,

Figure 9 shows a perspective view of apparatus and operation in accordance with the present invention,

Figure 10 shows another perspective view of the apparatus in operation in accordance with the present invention,

Figure 11 shows a perspective view of the ram unit (left) in an engageable position with the carousel (right) in accordance with the current invention.

DETAILED DESCRIPTION OF THE INVENTION

In the preferred sequence of events follows those described within the flow chart in Figure 7 and shown schematically in perspective views of the apparatus carrying out the operation in accordance with the current invention in Figure 9 and Figure 10.

In the preferred form of the present invention a magazine feed of (optionally topped and tailed) carrots (could be other foodstuffs however) are serially feed by a ram into a shaver of the kind as shown in Figure 3B.

Preferably the carrot form has preferably been topped and tailed (for example, to a length of, for example, 87 mm) in accordance with Figure 3A and where over size as far as girth is concerned, has been subjected to some reduction in its size either by abrasion, cutting, trimming or the like.

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As can be seen from the arrangement of Figure 3B the generally cylindrical form of shaver has a blade 1 inclined relative to the rotational axis shown by the broken line thereby deriving for a produce item such as a carrot a substantially frustoconical form and preferably a non pointed smaller end at the end of the frustum.

5 As can be seen from Figure 3A, the carrots have their distal end region 25 as well as a crowned end region 26. The crowning at 26 preferably has the effect of removing any vestige of the stalk as shown by the dotted lines of Figure 3A.

Figure 4 shows in an exploded form, (i.e. exploded to the extent that subassembly 21 is spaced away from the zone of the broken outline 5 (for clarity of
10 explanation)) of apparatus in accordance with the present invention.

The broken away region 21 includes a carrot feeding chute 6 capable of being arranged whereby a stuffer ram (not shown) but outwardly drivable from within the tube 7 serially acts on the carrots and can stuff each carrot into an indexed shaver 8, being a shaver substantially as described or some variant of that described with respect
15 to Figure 3B.

Each shaver 8, 8A and 8B is itself rotatable about its own axis, (i.e. axis AA as shown in Figure 3) under the action of an electric motor 9 which with its geared shaft 10 has the capability (through gears 16 and 17 meshing) when desired of continuously or intermittently rotating its shaver 8, 8A and/or 8B as the occasion requires. The shaft
20 end 10A is preferably journalled in part of the assembly 4.

The progression of the carousel 11 is in the arrowed direction shown in Figure 5 such that from the indexed and stationed relationship between the stuffer tube 7 and the shaver 8, a carrot form is shaven by rotation of the shaver 8 prior to its place at that station being taken by shaver 8B.

25 At this time shaver 8 is aligned with crowning apparatus being a cutter or former (not shown) shown generally by the region 12 which has the effect (whether as the crowning cutter or former rotates itself and/or the shaver 8A rotates about its axis) of crowning each carrot at the end 3.

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Thereafter, further rotation of the carousel of the apparatus moves the shaver 8 to the condition shown in Figure 6 whereupon a water supply entering at 22 will have the effect of blasting a carrot that has been shaped and crowned out of its support in shaver 8 and out of a discharge outlet 13.

5 Actual rotation of the carousel 11 itself can be under the action of a ram presenting out of the tube 14 which will bear successively, as far as stroke is concerned, on the vane series 15.

It can be seen therefore that, if desired, the motor 9 can be continuously or continually rotated so as to drivingly rotate the shavers (as and when desired) whilst,
10 independently of any such positive drive, there is still some prospect of shaver drive as a result of progression of gears 16 about gear 17.

The carousel 11 with its vanes 15 can be progressively yet intermittently be moved from one indexing condition to another indexing condition to allow serially (A) stuffing and shaving, (B) crowning and (C) ejection.

15 The control of the feed of the carrots to a stage where they might be hopper feed into magazines each for a shaver of the kind depicted in Figure 3B can be any suitable apparatus and may include one or more handling types of apparatus such as, for example, disclosed in Grimmway Enterprises Inc. PCT/US00/10449 (published as WO 00/64288).

20 In operation, preferably, the cutter 2 with its conical passageway 3 and angled cutter 4 is adapted to receive a pre-sized carrot form as shown in Figures 8A, 8B, 8C and 8D with the ram (any suitable carrot engaging configuration) 18 having the ability to stabilize the carrot whilst the shaver 23 rotates or alternatively to rotate the pre-sized carrot form 24 as the shaving apparatus 23 is kept stationery, or (less preferred) some
25 combination of both. The carousel unit 15 and ram 7 are shown schematically in Figure 11.

As can be seen by having a control on the feed of the ram 18 to the condition as shown in Figure 8D a uniform product form results owing to a uniform length of pre-sized carrot having been presented into the shaving apparatus.

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Once and/or as the ram 5 retracts air or another fluid can ensure that the formed carrot 19 is ejected from the passageway 3, such air or fluid being blasted in, for example, through a passageway or duct such as 20.

Persons skilled in the art will appreciate how the present invention enables a
5 reject carrot to be topped and tailed and shaped to an appetizing form since generally it is the exterior of the carrot that is blemished.

Such uniform carrot forms will find application as a snack and/or as an embellishment for use in food preparation and/or cooking.

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WHAT WE CLAIM IS:

1. **Apparatus for shaping as products produce items** (such as root or bulbous vegetables such as carrots), said apparatus comprising or including
 - a carousel having a rotational axis,
 - 5 a series of produce item shavers arrayed about the rotational axis of, yet carried by, the carousel, each having at least one blade rotatable about its associated rotational axis substantially parallel to but spaced outwardly of the rotational axis of the carousel,
 - a drive for each produce item shaver to rotate each about its rotational axis,
 - a carousel rotation and indexing arrangement to rotate the carousel about its
 - 10 rotational axis to serially present stations to the produce shavers,
 - a magazine or hopper or robotic fed product stuffer to drive a produce item for shaving into an indexed and stuffing stationed shaver for shaving of that produce item as the shaver but not the carousel is drivingly rotated,
 - a product crowner to act on the recently shaven produce item at a station at
 - 15 which the shaver is indexed, other than the stuffing station, whilst still supporting its shaven product, and
 - a product ejection arrangement to act on the shaven and crowned product whilst the shaver still supports the product to remove the product in a direction opposite its stuffing direction.
- 20 2. **Apparatus of claim 1** wherein the product ejection arrangement uses a fluid flow or is a fluid flow.
3. **Apparatus for shaping a product** (from produce such as a carrot), said apparatus comprising or including
 - a carousel having a rotational axis,
 - 25 a series of produce shavers arrayed about the rotational axis of, yet carried by, the carousel, each shaver having at least one blade rotatable about its rotational axis substantially parallel to, but spaced outwardly of, the rotational axis of the carousel,
 - a drive for each produce shaver to rotate each about its rotational axis,

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a carousel rotation and indexing arrangement to rotate the carousel about its rotational axis to serially present machine functions to the produce shavers,

a magazine or hopper or robotic fed product stuffer to drive produce for shaving into an indexed shaver for shaving as the shaver is drivingly rotated,

5 a product crowner to act on a shaven produce item whilst its shaver is still supporting the shaven produce, and

a product ejection arrangement (e.g. a fluid flow) to act on the shaven and crowned produce whilst the shaver still supports the produce to remove the produce as a shaven and crowned product in a direction opposite its stuffing direction.

10 4. **A method of shaping a product from product** (e.g. such as a carrot), said method comprising or including

feeding a feedstock of the produce, one item at a time, longitudinally into a dedicated shaver carried by a carousel and shaping the produce by shaving whilst holding the produce relatively still in the shaver as at least one blade the shaver rotates
15 about the axis of the longitudinal item,

crown shaping a larger end of each shaven produce whilst it is still supported by its shaver, and

ejecting each shaped and crowned product from the shaver.

5. A method of claim 4 wherein each crowning and ejection step for a particular
20 produce item occurs at a different rotational position (e.g. optionally at stations) of the shaver about the rotational axis of the carousel.

6. A method of claim 4 or 5 wherein the produce item feed into its shaver from a magazine or hopper under the action of a ram.

7. A method of any one of claims 4 to 6 wherein the crowning is by a ram
25 supported produce item reliant on rotation of the blade(s) of the shaver relative to the produce (whether the produce itself is cause to rotate by the shaver or the blade is rotated, or both).

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8. A method of any one of claims 4 to 7 wherein the ejection is under the action of a fluid flow.
9. **A method of preparing a root or bulbous vegetable** (e.g. carrot, parsnip, beetroot or the like), said method comprising or including
- 5 (optionally) pre-sizing vegetables of the same kind to provide a sufficient feedstock thereof (“feedstock form”),
- mechanically shaping the feedstock form using apparatus of the present invention to a predetermined product form and product size (“the product form”), and
- creating a sterile package that includes the product forms.
- 10 10. A method of claim 9 wherein the creation of the sterile package involves both a sterilization step for the shaped product forms as well as the packaging thereof.
11. A method of claim 9 or 10 wherein said vegetables are carrots and (i) the pre-sizing is by (preferably by one or both) topping and tailing and/or (ii) the predetermined form and size is to a predetermined length and girth of a simulated
- 15 carrot form.
12. A method of any one of claims 9 to 11 wherein each said product shaver is a substantially conical or frustoconical shaver that performs in a manner similar to a pencil sharpener with the feedstock carrot being stuffed into the shaver to a uniform extent and being so held so as to provide a shaving relativity of rotational movement
- 20 therein.
13. A method of claim 12 wherein the shaver rotates and the carrot does not, or *vice versa*.
14. A method of any one of claims 9 to 13 wherein a ram drives each feedstock carrot of predetermined length in a predetermined distance into the shaver.
- 25 15. A method of claim 14 wherein said ram feeds a feedstock form from a magazine or hopper thereof.

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16. A method of any one of claims 9 to 15 wherein each shaped carrot is discharged from the shaving apparatus from the larger end thereof under the action of a fluid (e.g. air or water) introduced from the other end.

17. **A method of providing a carrot product which is a predetermined carrot**
5 **simulating form and a substantially predetermined reduced size**, said method comprising or including

(optionally) cutting a carrot to length to provide a feedstock carrot of a predetermined length and a girth beyond that desired,

feeding each such feedstock carrot into a shaver of apparatus of the present
10 invention, said feeding being a mechanical feed of the carrot into the shaver and shaping the carrot,

crown shaping of the still shaver supported carrot using a product crowner, and removing the thus sized and shaped carrot form from such shaving apparatus prior to the

15 infeed of a subsequent feedstock carrot there into.

18. A method of claim 17 which includes in addition sterilizing and packing such carrot forms in a sterile pack.

19. **A method of preparing a root or bulbous vegetable** (e.g. carrot, parsnip, beetroot or the like), said method comprising or including

20 pre-sizing vegetables of the same kind to provide a sufficient feedstock thereof (“feedstock form”),

mechanically shaping the feedstock form to a predetermined product form and product size (“the product form”), and

creating a sterile package that includes the product forms.

25 20. A method of claim 19 wherein the creation of the sterile package involves both a sterilization step for the shaped product forms as well as the packaging thereof.

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21. A method of claim 19 or 20 wherein said vegetables are carrots and (i) the pre-sizing is by (preferably both) topping and tailing and/or (ii) the predetermined form and size is to a predetermined length and girth of a simulated carrot form.
22. A method of claim 21 wherein step (i) and/or step (ii) are (is) machine
5 automated.
23. A method of claim 21 or 22 wherein the shaping step is performed by serially presenting a number of the pre-sized feedstock carrots to a shaping apparatus.
24. A method of claim 23 wherein said shaping apparatus is a substantially conical or frustoconical shaver that performs in a manner similar to a pencil sharpener with the
10 feedstock carrot being machine feed into the shaver to a uniform extent and being machine held so as to provide a shaving relativity of rotational movement therein.
25. A method of claim 24 where any over girth carrot for the shaver is either excluded or trimmed in its girth to allow entry fully into the shaver.
26. A method of claim 24 or 25 wherein the shaver rotates and the carrot does not, or
15 *vice versa*.
27. A method of claim 26 wherein a ram drives each feedstock carrot of predetermined length in a predetermined distance into the shaver.
28. A method of claim 27 wherein said ram feeds a feedstock form from a magazine thereof.
- 20 29. A method of any one of claims 24 to 28 wherein each shaped carrot is discharged from the shaving apparatus from the larger end thereof under the action of air or other fluid introduced from the other end.
30. **A method of providing a carrot product which is a predetermined carrot simulating form and a substantially predetermined reduced size, said method**
25 **comprising or including**
- cutting a carrot to length to provide a feedstock carrot of a predetermined length and a girth beyond that desired, and

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feeding each such feedstock carrot into a shaver, said feeding being a mechanical feed of the known length feedstock carrot a predetermined distance into the shaving apparatus and

removing the thus sized and shaped carrot form from such shaving apparatus
5 prior to the infeed of a subsequent feedstock carrot there into.

31. A method of claim 30 which includes in addition sterilizing and packing such carrot forms in a sterile pack.

32. A method of claim 31 wherein a preservative, composition, solution, etc. can be associated with the carrot forms in the pack.

10 33. A **carrot form** that is the result of topping and tailing a carrot and shaving the truncated carrot form to a carrot simulating form of lesser girth.

34. A **sterile packed carrot form** being a reduced size and girth carrot simulating form.

35. Apparatus substantially as hereindescribed with reference to the accompanying
15 drawings.

36. Any shaped foodstuff that has been shaped using a method or any one of claims 4 to 32 or apparatus of any one of claims 1 to 3 and 35.

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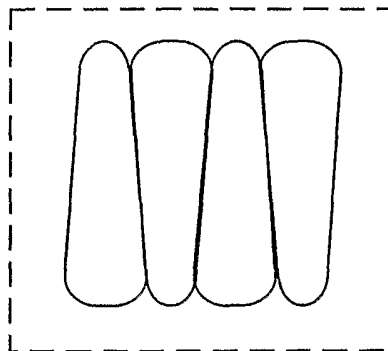


FIGURE 1

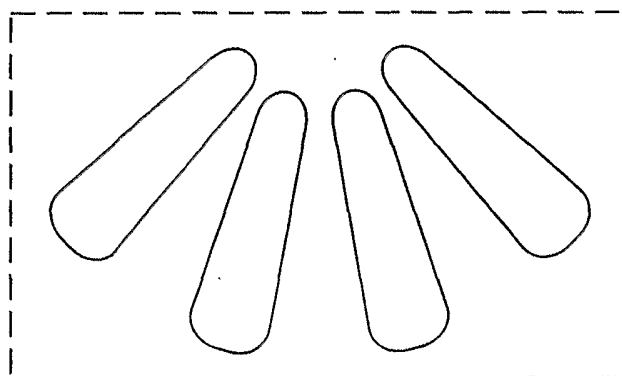


FIGURE 2

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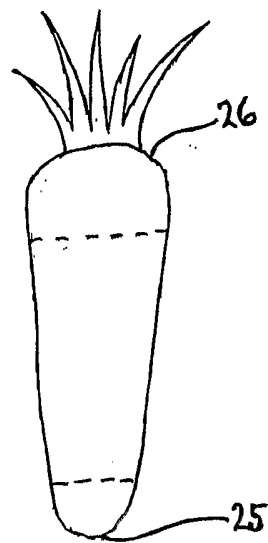


FIGURE 3A

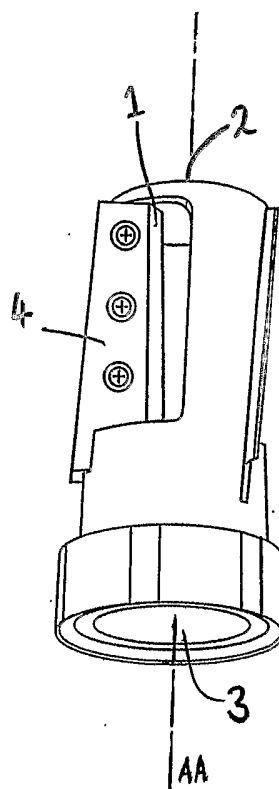


FIGURE 3B

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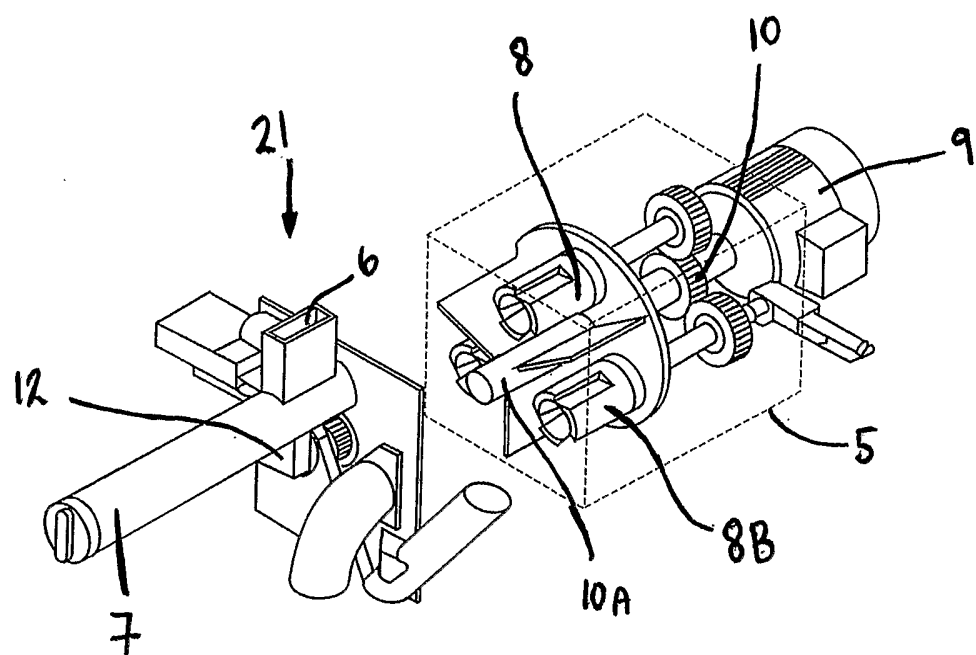


FIGURE 4

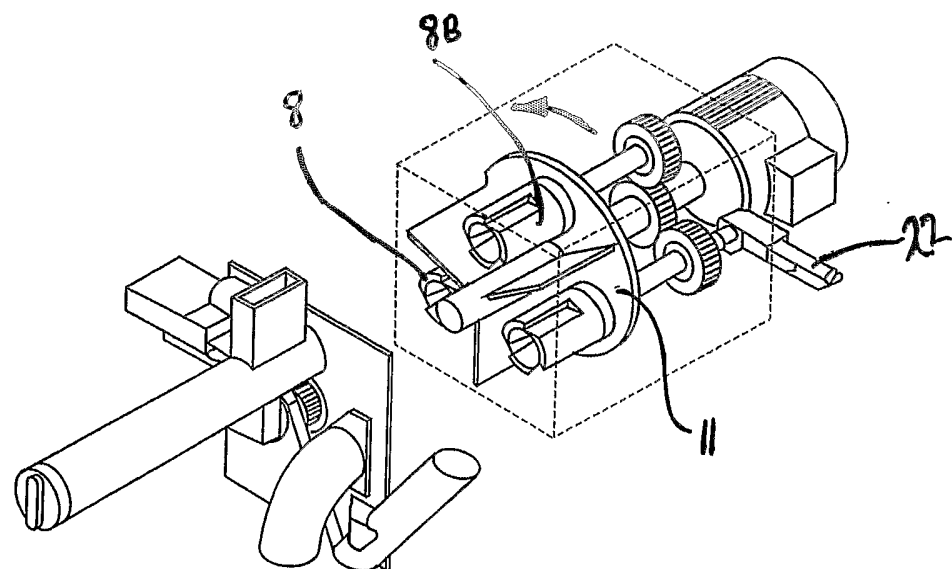


FIGURE 5

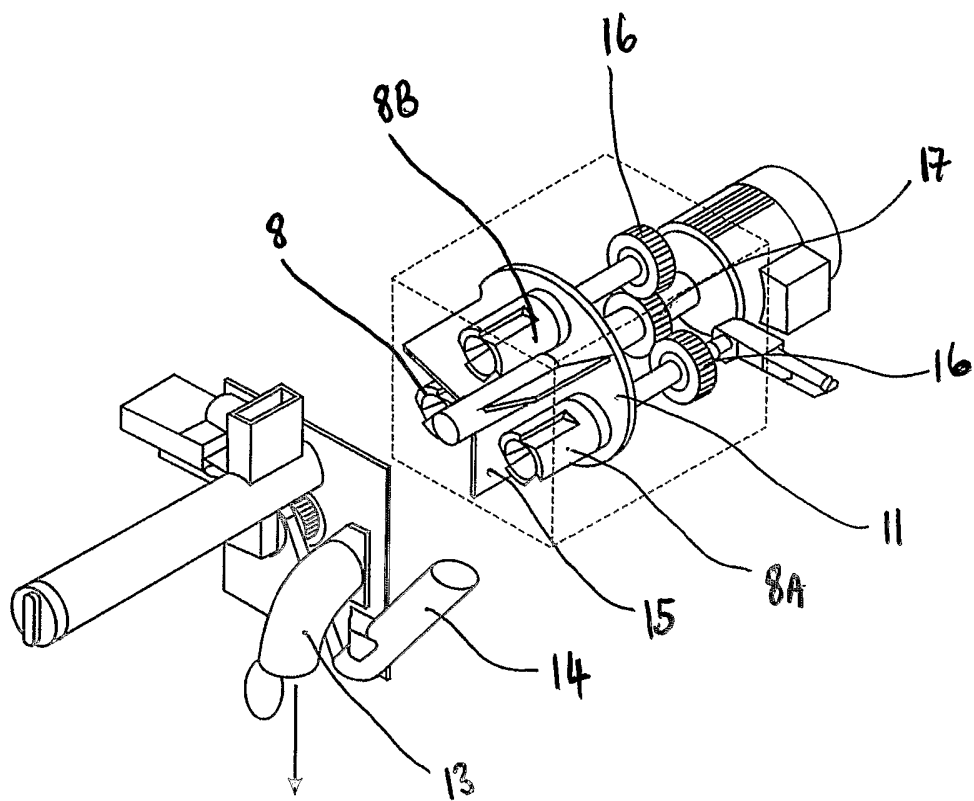


FIGURE 6

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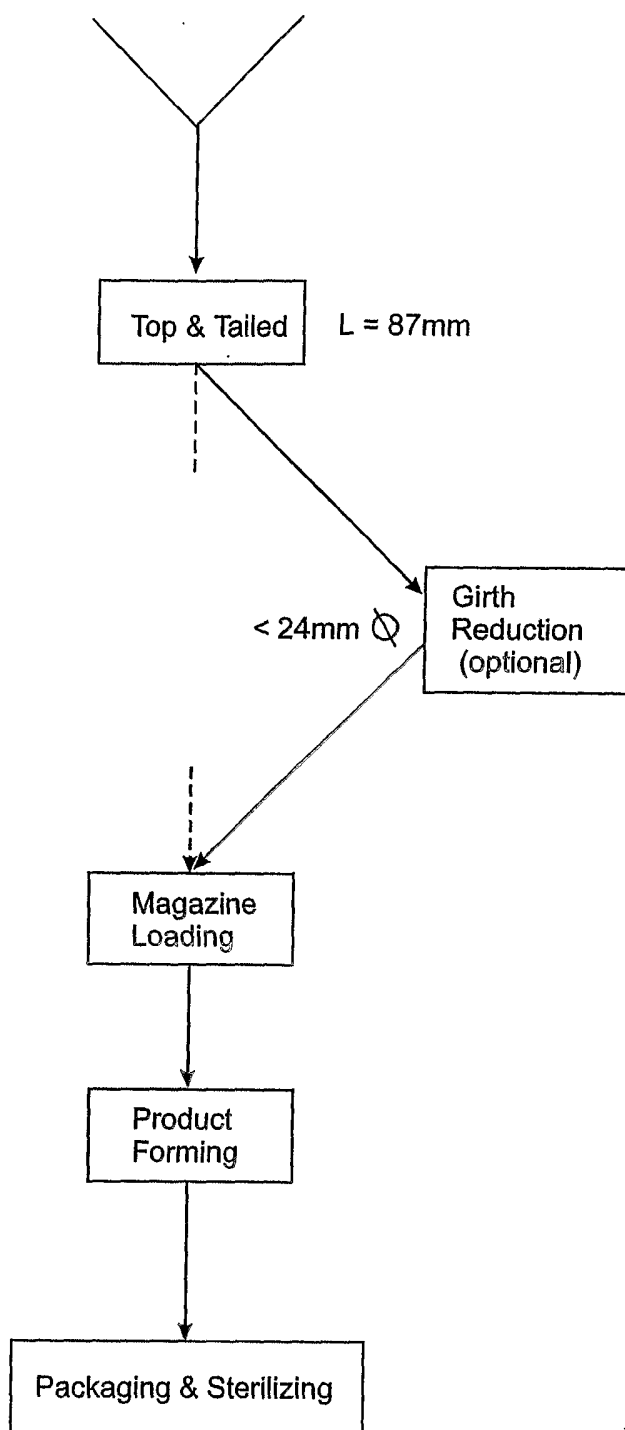


FIGURE 7

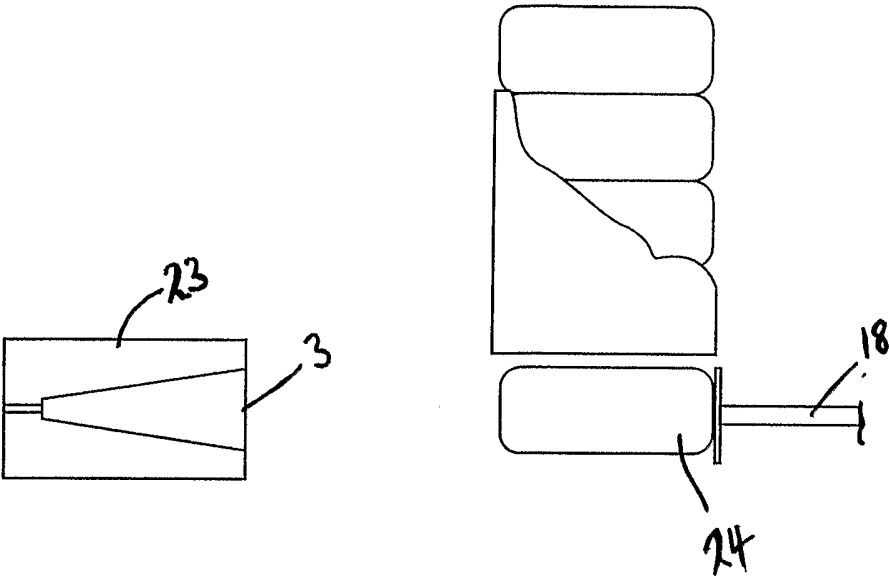


FIGURE 8A

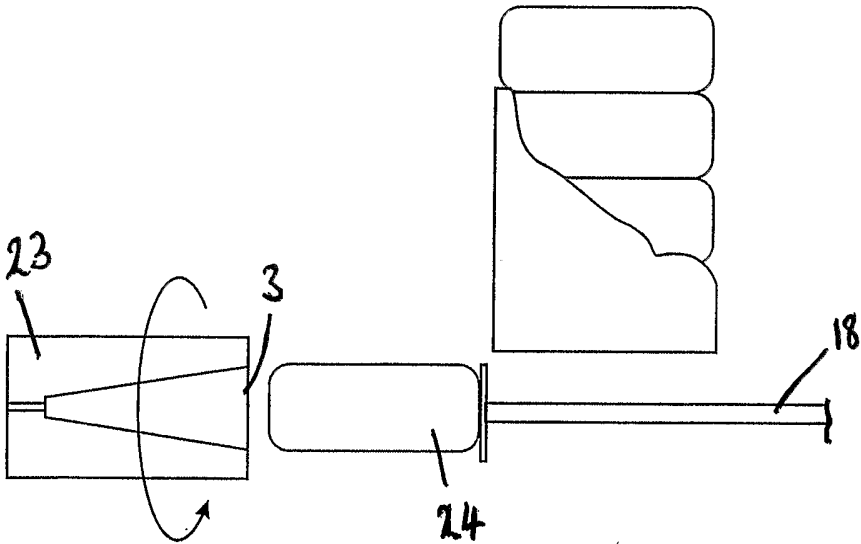


FIGURE 8B

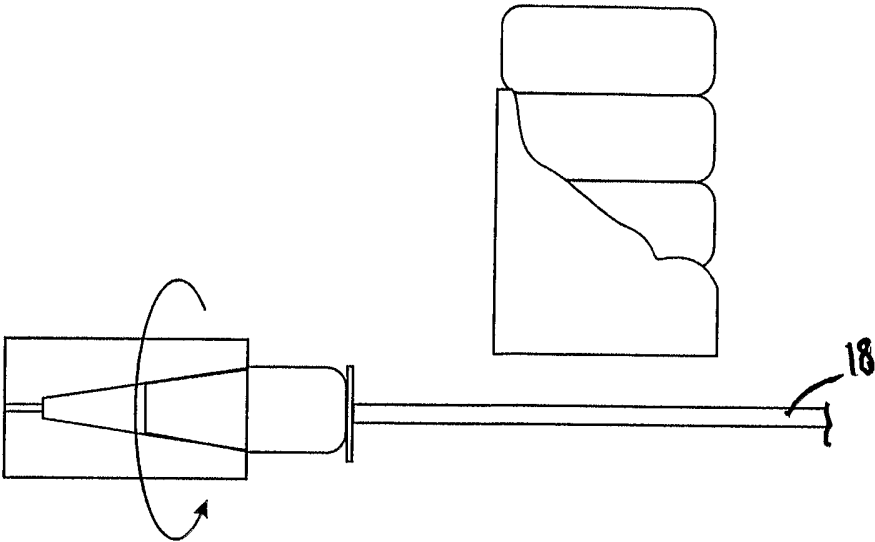


FIGURE 8C

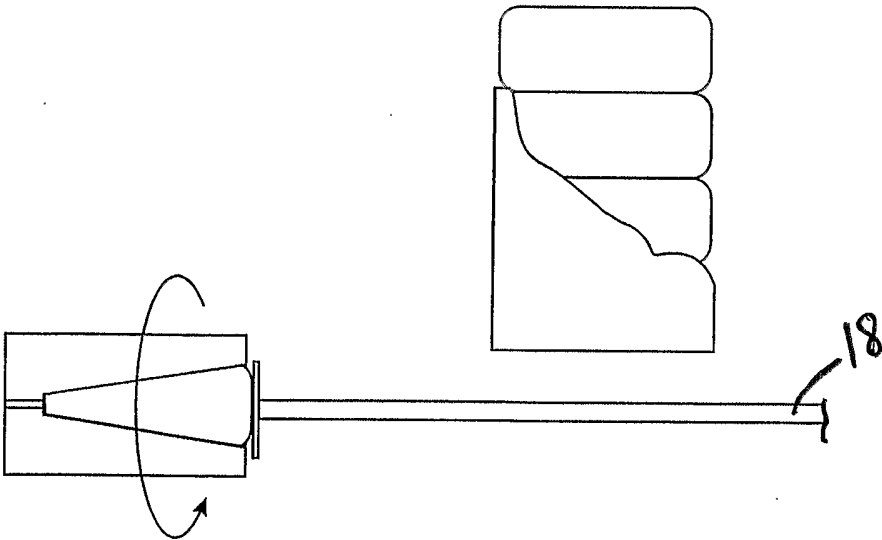


FIGURE 8D

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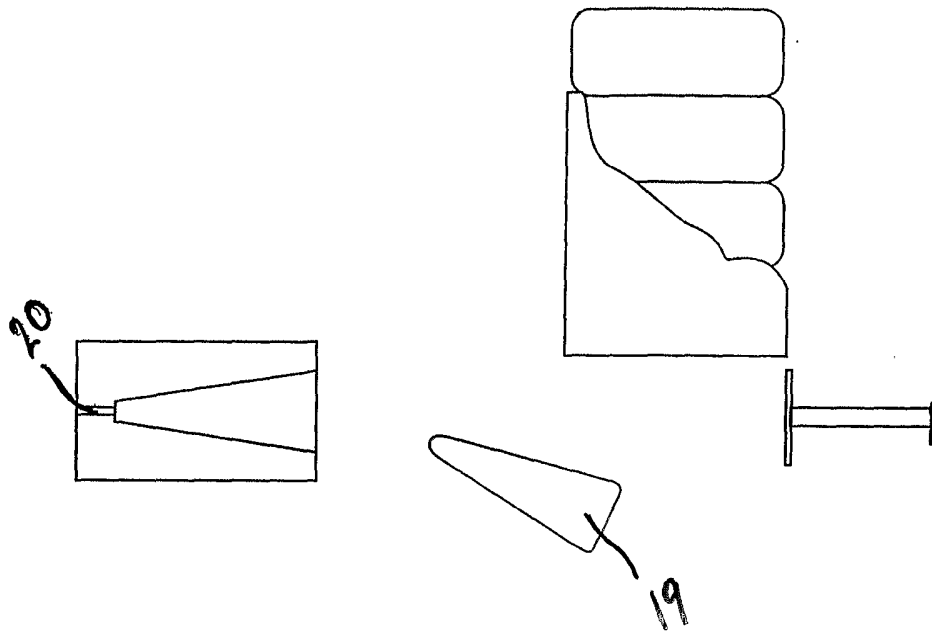


FIGURE 8E

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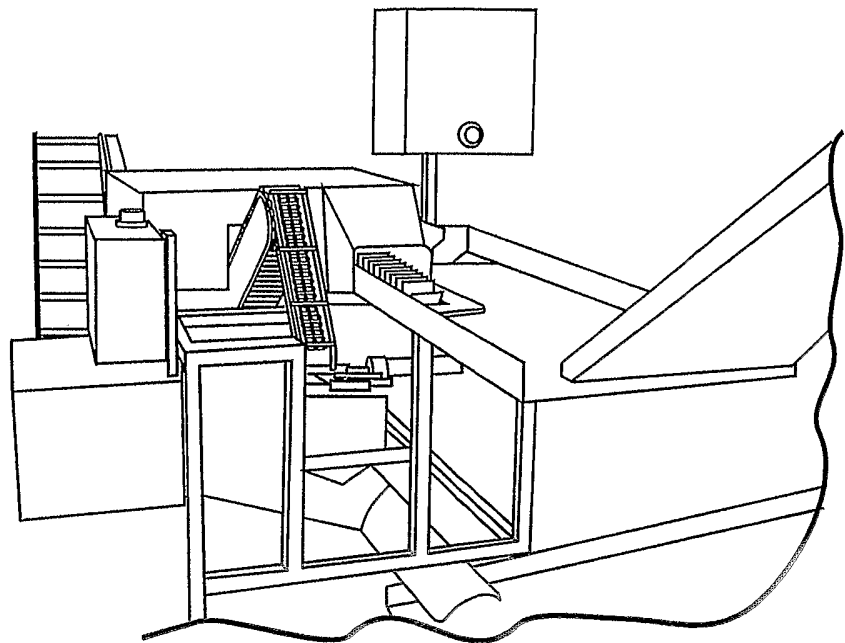


FIGURE 9

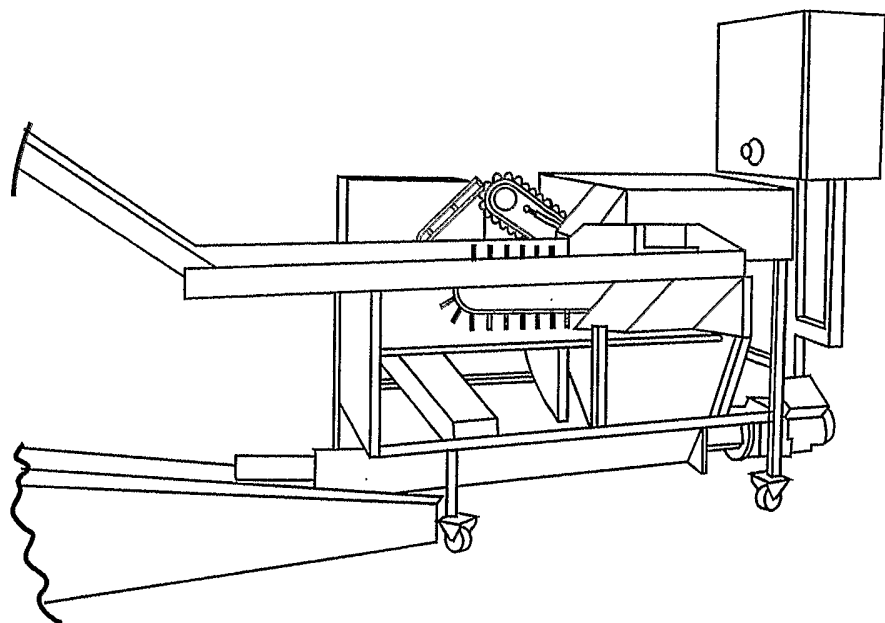


FIGURE 10

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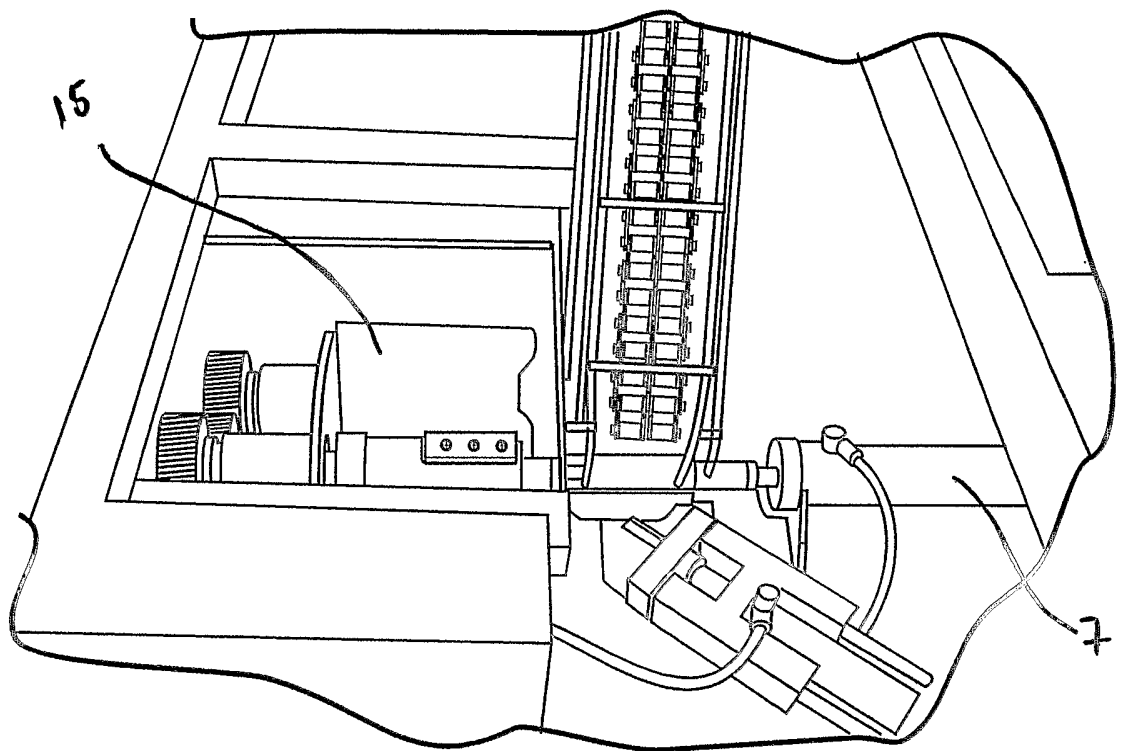


FIGURE 11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ2004/000049

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl. ⁷ : A23N 15/00, 15/04, 7/00, 7/02		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU : IPC A23N 15/00, 15/04, 7/00, 7/02 (1973 - 2004)		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DWPI IPC A23N, A47J 017/- & keywords: vegetable, carrot, parsnip, beetroot, potato, shave, peel, scrap, shape, form, regular, configure, contour, outline, profile.		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5582096 A (MARTON) 10 December 1996 Whole document	19 - 23, 30 - 34
X	WO 1990/001273 A1 (SAXBY et al) 22 February 1990 Whole document	19 - 23, 30 - 34
X	EP 383679 A1 (FISCHER) 22 August 1990 Whole document	19 - 23, 30 - 34
☒ Further documents are listed in the continuation of Box C ☒ See patent family annex		
* "A"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search 31 May 2004		Date of mailing of the international search report - 3 JUN 2004
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer B. NGUYEN Telephone No : (02) 6283 2306

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ2004/000049

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH 679203 A5 (SCHOEPS) 15 January 1992 Whole document	19 - 23, 30 - 34
A	DE 19636195 A1 (KOCH et al) 20 March 1997 Abstract	1 - 36

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/NZ2004/000049

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
US	5582096	CA	2202691
EP	0811326	GB	2304275
WO	90/01273	NONE	
EP	0383679	FR	2643248
CH	679203	NONE	
DE	19636195	NONE	
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.			
END OF ANNEX			