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### (54) Method and apparatus for handling food products

(57) A first main conveyor 5 delivers frozen food products from a first freezer 3 to a first packaging station 6. A second main conveyor 7 delivers frozen food products from a second freezer 4 to a second packaging station 8. A first transfer conveyor 10 is used to transfer food products to the second conveyor 7. The second

conveyor 7 is adjusted in length to deliver the food products to a spiral delivery chute 30, a diverting chute 35 or to deliver food products to a second transfer conveyor 11 feeding the first main conveyor 5.

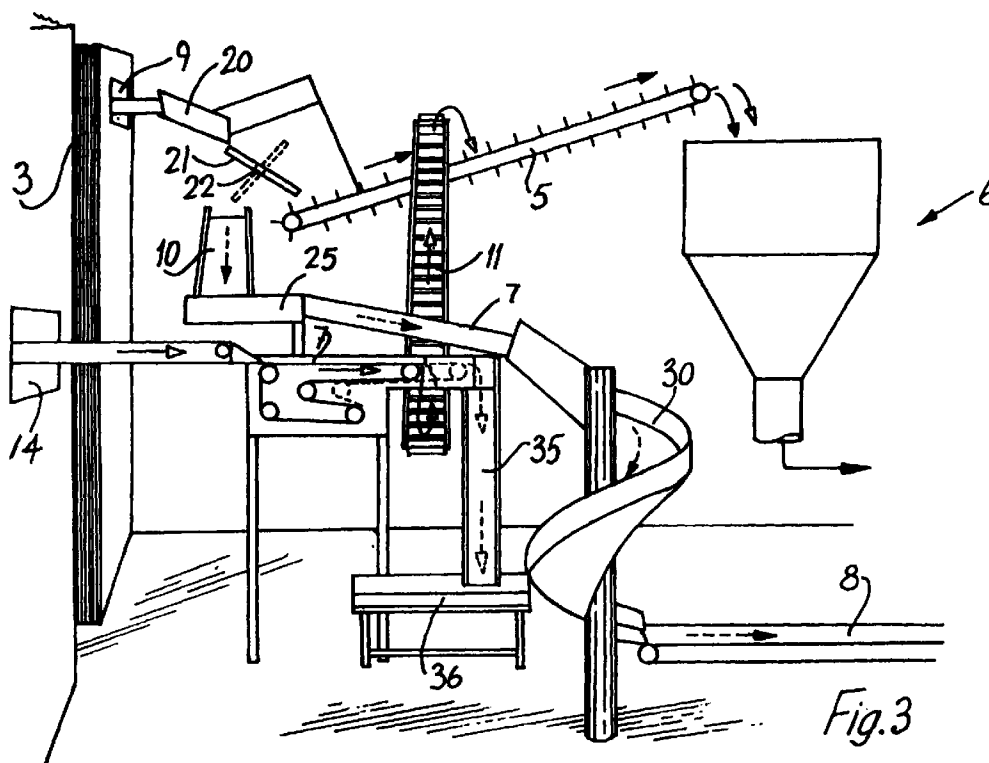


Fig.3

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## Description

### Introduction

[0001] The invention relates to a method and apparatus for handling food products and in particular for handling white meat, especially chicken products.

[0002] In my UK-A-2269083 I have described a method for preparing white meat food products.

[0003] With the increasing demands imposed by short lead times there is an ever increasing need to provide methods for handling such food products which allow them to be prepared very efficiently and with the flexibility to maximise throughput with available production resources while facilitating the production of a range of different products.

[0004] This invention is directed towards providing an improved handling method and apparatus to address these issues.

### Statements of Invention

[0005] According to the invention there is provided a method for handling a range of food products comprising the steps of:-

preparing first food products on a first preparation line;

preparing second food products on a second preparation line;

freezing the first food products in a first spiral freezer;

freezing the second food products in a second spiral freezer;

directing the first frozen food products from an upper outlet of the first spiral freezer to a first main conveyor feeding a first packaging station or along a first transfer conveyor to a second main conveyor feeding a second packaging station;

directing the second frozen food products from an upper outlet of the second spiral freezer to the second main conveyor feeding the second packaging station or along a second transfer conveyor to the first main conveyor feeding the first packaging station;

turning one of the frozen food products on transfer to direct the transferred food product along a transfer conveyor section extending generally parallel to the first or second main conveyor; and

adjusting the position of the first or second main conveyor to receive frozen food products from the

transfer conveyor section.

[0006] In one embodiment of the invention the position of the first or second main conveyor is adjusted by adjusting the length of the main conveyor to a first position for receiving frozen food products from the adjacent spiral freezer outlet for delivery to the associated packaging station or a second position for receiving frozen food products from the transfer conveyor section.

[0007] Preferably the position of the first or second main conveyor is adjusted by adjusting the length of the main conveyor between the first or second positions and a third position corresponding to a take-off of frozen food products to a separate packaging station.

[0008] In a preferred embodiment of the invention the first frozen food products are led, on transfer, downwardly to the second main conveyor.

[0009] Preferably the second frozen food products are led, on transfer, upwardly to the first main conveyor.

[0010] Ideally, the first or second main conveyor delivers the frozen food products into a chute for delivery to the associated packaging station. Preferably, the chute is of spiral form for delivery of the food products to the associated packaging station.

[0011] The invention also provides apparatus for handling a range of food products comprising:

a first preparation line for preparing first food products;

a second preparation line for preparing second food products;

a first spiral freezer for freezing the first food products, the freezer having an upper outlet;

a second spiral freezer for freezing the second food products, the freezer having an upper outlet;

a first main conveyor for delivering frozen food products to a first packaging station;

a second main conveyor for delivering frozen food products to a second packaging station;

a first transfer conveyor for transferring food products from the first spiral freezer outlet to the second main conveyor;

a second transfer conveyor for transferring food products from the second spiral freezer outlet to the first main conveyor;

first directing means for directing frozen food products from the first spiral freezer to either the first main conveyor or the first transfer conveyor;

at least one of the transfer conveyors having a

transfer conveyor section extending generally parallel to the associated main conveyor; and

the associated first or second main conveyor being adjustably mounted to receive frozen food products from the transfer section.

**[0012]** In a preferred embodiment of this aspect of the invention the first or second main conveyor is length adjustable to a first position for receiving frozen food products from the adjacent spiral freezer outlet for delivery to the associated packaging station or a second position for receiving frozen food products from the transfer conveyor section. Preferably, the first or second main conveyor is adjustable between the first or second positions and a third position corresponding to a take-off of frozen food products to a separate packaging station.

**[0013]** In a particularly preferred arrangement the apparatus includes a delivery chute having an inlet to which frozen food products are delivered by the first or second main conveyor, the chute having an outlet through which the frozen food products are delivered to the associated packaging station. Preferably, the chute is of spiral form.

#### Brief Description of the Drawings

**[0014]** The invention will be more clearly understood from the following description thereof given by way of example only with reference to the accompanying drawings, in which:-

Fig. 1 is a plan view of an apparatus for handling a range of food products according to the invention;

Fig. 2 is a plan view on an enlarged scale of portion of the apparatus of Fig. 1; and

Fig. 3 is a side, partially perspective view of the apparatus of Fig. 2.

#### Detailed Description

**[0015]** Referring to the drawings, there is illustrated an apparatus for handling a range of food products comprising a first preparation line 1 for preparing fresh food products such as chicken pieces, for example, nuggets, burgers and the like and a second preparation line 2 for preparing second food products such as the same or different food products to those of preparation line 1. Generally, each of the preparation lines 1 and 2 will include deep frying steps. Details of typical preparation lines are given, for example, in my UK-A-2269083. The apparatus includes a first spiral freezer 3 associated with the preparation line 1 and a second spiral freezer 4, associated with the preparation line 2. A first main conveyor 5 delivers frozen food products to a first packaging station 6. Similarly, a second main conveyor 7 is

used to deliver frozen food products to a second packaging station 8. A first transfer conveyor 10 is used for transferring food products from the outlet 9 of the first spiral freezer 3 and a second transfer conveyor 11 is used for transferring food products from the second spiral freezer 4 to the first main conveyor 5.

**[0016]** First directing means for directing frozen food products from the first spiral freezer 3 to either the first main conveyor 5 or the first transfer conveyor 10 comprises a take-off chute 20 and a deflecting plate 21 which is pivotally mounted at 22 for movement between a first position illustrated in full lines in Fig 3, in which the food products from the outlet 9 of the first spiral freezer 3 are directed to the first main conveyor 5, to a second position illustrated in dotted outline in Fig 3 in which the food products from the first spiral freezer 3 are directed onto the first transfer conveyor 10.

**[0017]** The first transfer conveyor 10 includes a section 25 extending generally parallel to the associated main second conveyor 7. To facilitate delivery of food products delivered onto the second conveyor 7 into different packing lines, the conveyor 7 is in this case length adjustable from a first extended position in which the food products from the second spiral freezer 4 are delivered directly onto the second conveyor 7 and through a spiral delivery chute 30 onto the packaging line 8. The length of the conveyor 7 is adjustable to a second retracted position illustrated in full lines in Fig 3, in which the food products from the second spiral freezer 4 are delivered onto the second transfer conveyor 11 for delivery onto the first main conveyor 5 to the packaging station 6. In this case the second main conveyor 7 is also adjustable to a third position intermediate the first and second positions in which the food products from the second spiral freezer are delivered along a diverting chute 35 to a further packaging station 36. Thus, the length adjustment of the second main conveyor 7 provides a second directing means for directing freezer food products from the second spiral freezer outlet 14 to either the second main conveyor 7 or to the second transfer conveyor 11.

**[0018]** It will be noted that the outlet line from the first spiral freezer 3 is located above the outlet from the second spiral freezer 4 and consequently the first transfer conveyor 10 is directed downwardly to deliver the first food products from the first spiral freezer 3 to the second main conveyor 7. Similarly, the second transfer conveyor 11 is directed upwardly from the second main conveyor 7 for delivery of the second food products onto the first main conveyor 5 to the packaging station 6.

**[0019]** The handling method and apparatus of the invention for frozen food products achieves considerable flexibility in production efficiency as different, or indeed the same food products may be made independently on the lines 1 and 2 to the maximum production rates of those lines and then frozen in a way that optimises the capacity of both the spiral freezers 3 and 4. To achieve flexibility in packaging the frozen food products

from the spiral freezers 3 and 4 may, using the method and apparatus of the invention, be directed to any one of three separate packaging lines depending on requirements. For example, the packaging line 6 may be for catering packs of shaped white meat food products. The packaging line 8 may be for retail packs of similar products, and the packaging line 36 may be used for hand packaging of specialist lines. Thus the method and apparatus provides considerable flexibility and allows production efficiency to be optimised while minimising lead times, and allowing a range of different products to be produced.

[0020] Many variations on the specific embodiments of the invention will be readily apparent and accordingly, the invention is not limited to any embodiments hereinbefore described which may be varied in both construction and detail.

### Claims

1. A method for handling a range of food products comprising the steps of:-
  - preparing first food products on a first preparation line (1);
  - preparing second food products on a second preparation line (2);
  - freezing the first food products in a first spiral freezer (3);
  - freezing the second food products in a second spiral freezer (4);
  - directing the first frozen food products from an upper outlet (14) of the first spiral freezer (3) to a first main conveyor (5) feeding a first packaging station (6) or along a first transfer conveyor (10) to a second main conveyor (7) feeding a second packaging station (8);
  - directing the second frozen food products from an upper outlet of the second spiral freezer (4) to the second main conveyor (7) feeding the second packaging station (8) or along a second transfer conveyor (11) to the first main conveyor (5) feeding the first packaging station (6);
  - turning one of the frozen food products on transfer to direct the transferred food product along a transfer conveyor section (25) extending generally parallel to the first or second main conveyor (5, 7); and
  - adjusting the position of the first or second main conveyor (5, 7) to receive frozen food products from the transfer conveyor section (25).
2. A method as claimed in claim 1 wherein the position of the first or second main conveyor (5, 7) is adjusted by adjusting the length of the main conveyor (5, 7) to a first position for receiving frozen food products from the adjacent spiral freezer outlet (9, 14) for delivery to the associated packaging station (6, 8) or a second position for receiving frozen food products from the transfer conveyor section (25).
3. A method as claimed in claim 2 wherein the position of the first or second main conveyor is adjusted by adjusting the length of the main conveyor (5, 7) between the first or second positions and a third position corresponding to a take-off of frozen food products to a separate packaging station (36).
4. A method as claimed in any preceding claim wherein the first frozen food products are led, on transfer, downwardly to the second main conveyor (7).
5. A method as claimed in any preceding claim wherein the second frozen food products are led, on transfer, upwardly to the first main conveyor (5).
6. A method as claimed in any preceding claim wherein the first or second main conveyor (5, 7) delivers the frozen food products into a chute (30, 35) for delivery to the associated packaging station, preferably the chute (30) is of spiral form for delivery of the food products to the associated packaging station (8).
7. Apparatus for handling a range of food products comprising:
  - a first preparation line (1) for preparing first food products;
  - a second preparation line (2) for preparing second food products;
  - a first spiral freezer (3) for freezing the first food products, the freezer (3) having an upper outlet (9);
  - a second spiral freezer (4) for freezing the second food products, the freezer (4) having an upper outlet (14);
  - a first main conveyor (5) for delivering frozen food products to a first packaging station (6);
  - a second main conveyor (7) for delivering frozen food products to a second packaging station (8).

tion (8);

a first transfer conveyor (10) for transferring food products from the first spiral freezer outlet (9) to the second main conveyor (7);

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a second transfer conveyor (11) for transferring food products from the second spiral freezer (5) outlet (14) to the first main conveyor (5);

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first directing means (20, 21) for directing frozen food products from the first spiral freezer (3) to either the first main conveyor (5) or the first transfer conveyor (10);

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at least one of the transfer conveyors (10, 11) having a transfer conveyor section (25) extending generally parallel to the associated main conveyor (5, 7); and

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the associated first or second main conveyor (5, 7) being adjustably mounted to receive frozen food products from the transfer section (25).

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8. Apparatus as claimed in claim 7 wherein the first or second main conveyor (5, 7) is length adjustable to a first position for receiving frozen food products from the adjacent spiral freezer outlet (9, 14) for delivery to the associated packaging station (6, 8, 36) or a second position for receiving frozen food products from the transfer conveyor section (25).
9. Apparatus as claimed in claim 8 wherein the first or second main conveyor (5, 7) is adjustable between the first or second positions and a third position corresponding to a take-off of frozen food products to a separate packaging station (36).
10. Apparatus as claimed in any of claims 8 to 10 including a delivery chute (30, 35) having an inlet to which frozen food products are delivered by the first or second main conveyor (5, 7), the chute (30) having an outlet through which the frozen food products are delivered to the associated packaging station (8), preferably the chute (30) is of spiral form.

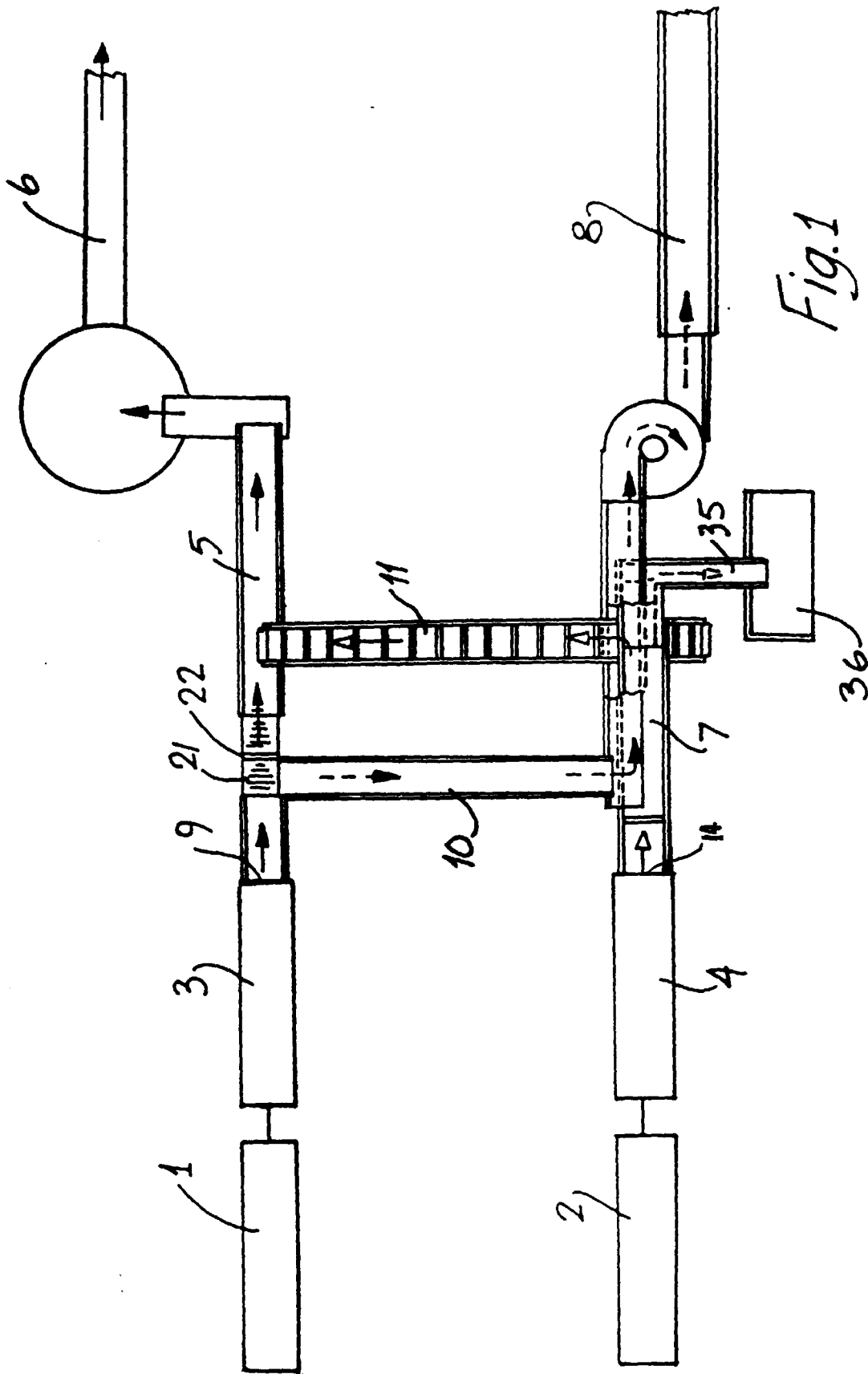
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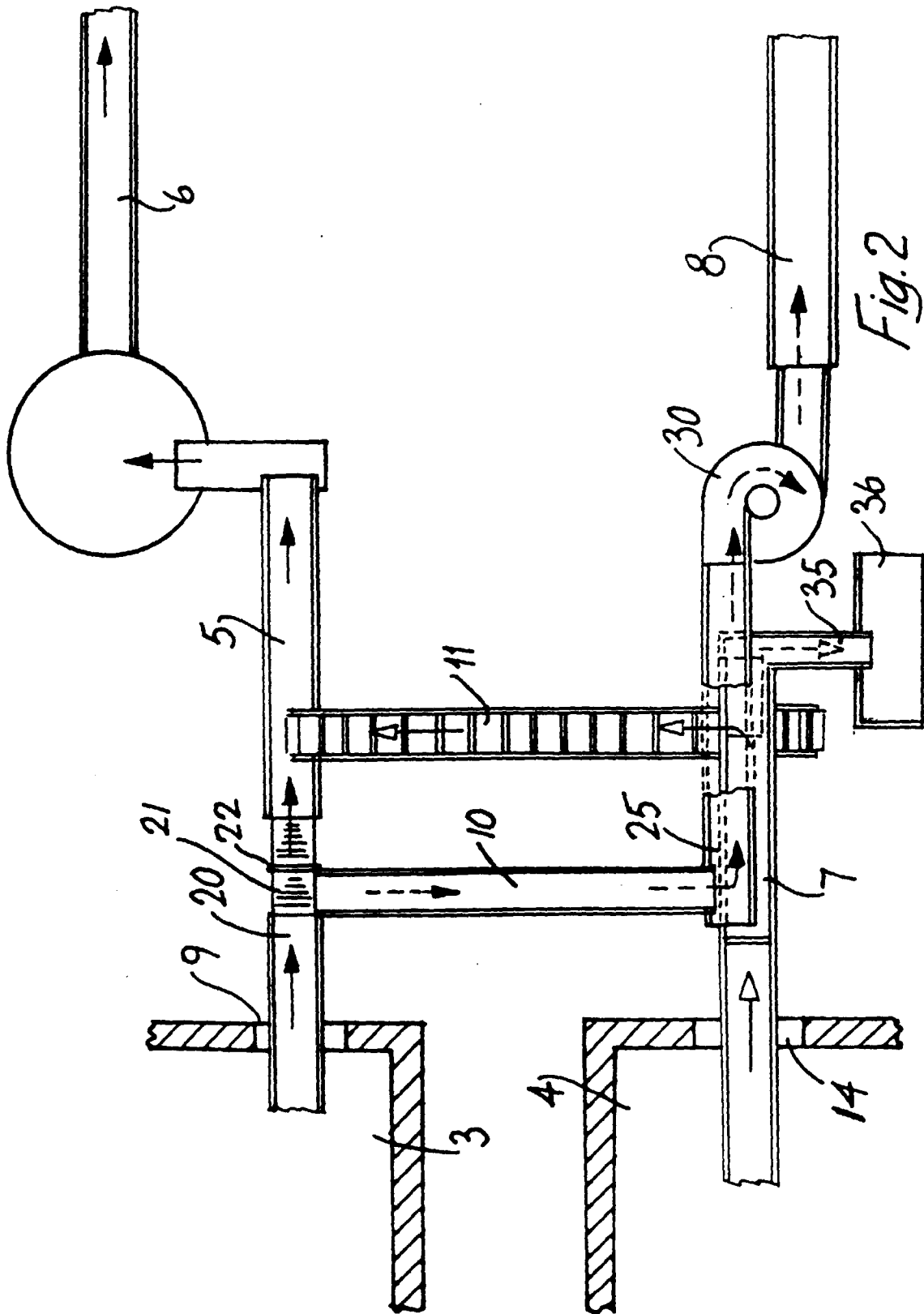
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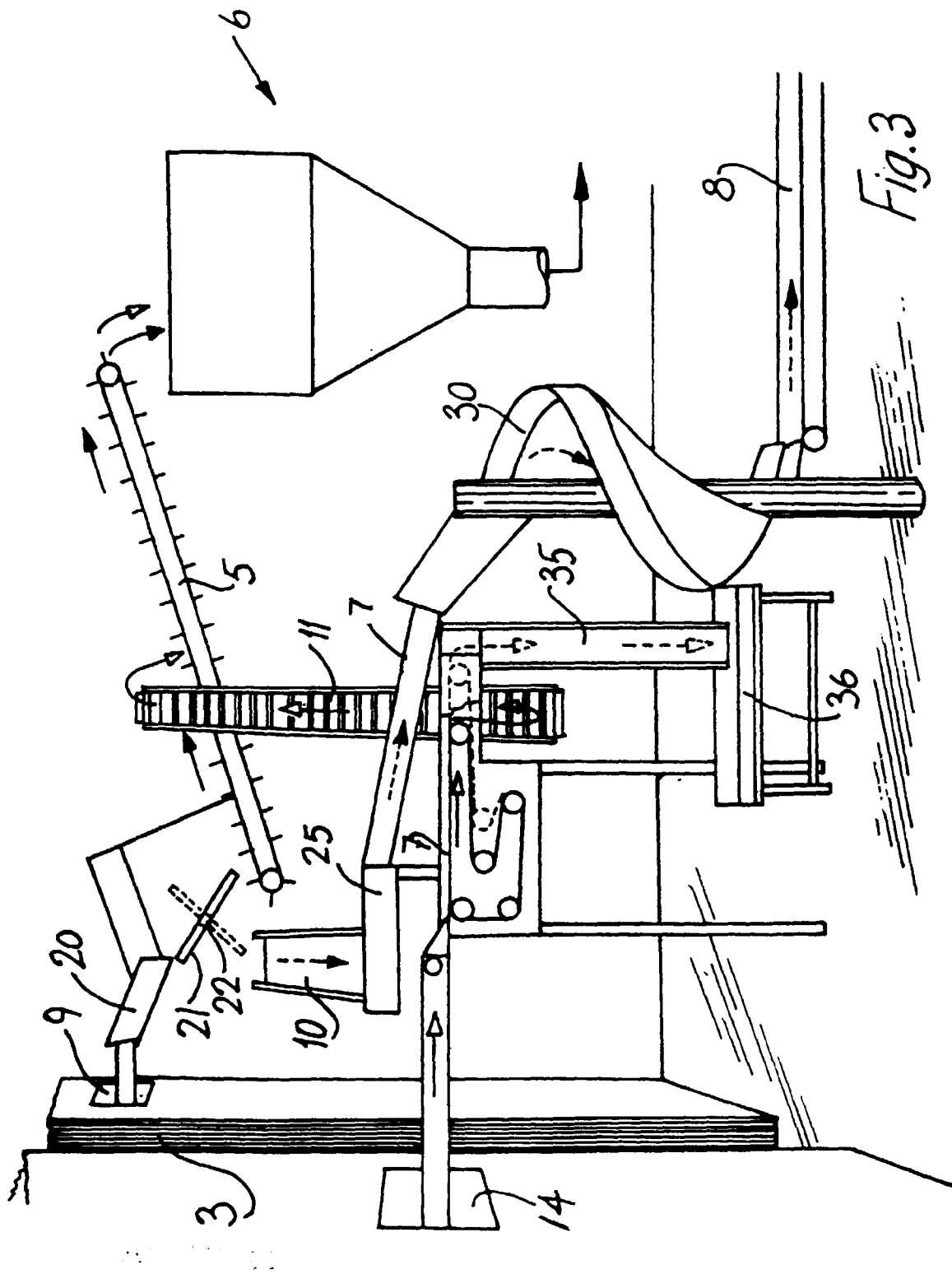
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# EUROPEAN SEARCH REPORT

Application Number  
EP 98 65 0092

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                          |                                  |                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Citation of document with indication, where appropriate, of relevant passages                            | Relevant to claim                | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FR 1 572 357 A (FRADIN)<br>27 June 1969 (1969-06-27)<br>* page 10, line 2 - line 18; figure 6 *<br>----- | 1,7                              | B65B25/06                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                          |                                  | TECHNICAL FIELDS SEARCHED (Int.Cl.6)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                          |                                  | B65B                                         |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                          |                                  |                                              |
| Place of search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                          | Date of completion of the search | Examiner                                     |
| THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                          | 29 July 1999                     | Claeys, H                                    |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                          |                                  |                                              |

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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| FR 1572357      A                         | 27-06-1969          | NONE                       |                     |

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82