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None

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## (54) Process for the airtight packing of products

(57) The invention relates to a process for the airtight packing of products in which the product (3) is placed between a lower wrapping layer (1) arranged on a suction table (7) and an upper airtight thermoplastic foil (2). A frame (8) is placed on the upper airtight foil (2) so that between the suction table (7) and the upper foil (2) a closed space is formed. Thereafter by means of infra-red heating bodies (5) the lower wrapping layer (1) and the upper airtight thermoplastic foil (2) are heated and a vacuum is applied by the suction table (7) to remove air from the space surrounding the product (3). This suction is applied via thermoplastic suction pipes (4) inserted between the layer (1) and the foil (2). The suction pipes (4) are first welded to the upper airtight thermoplastic foil (2) and the lower wrapping layer and so the suction results in an airtight packing.

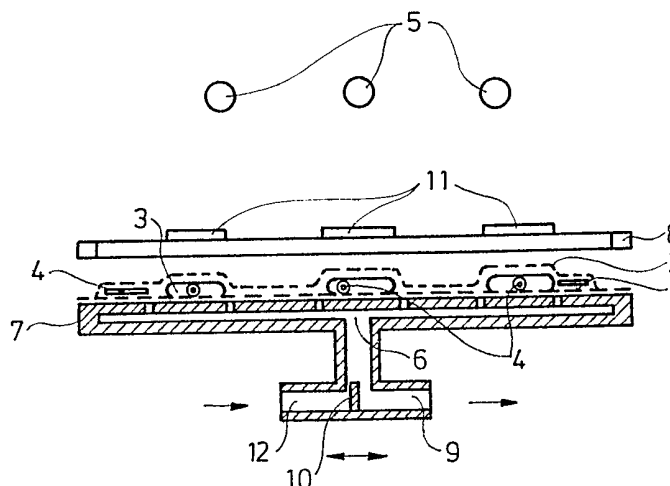


Fig.1

GB 2 146 971 A

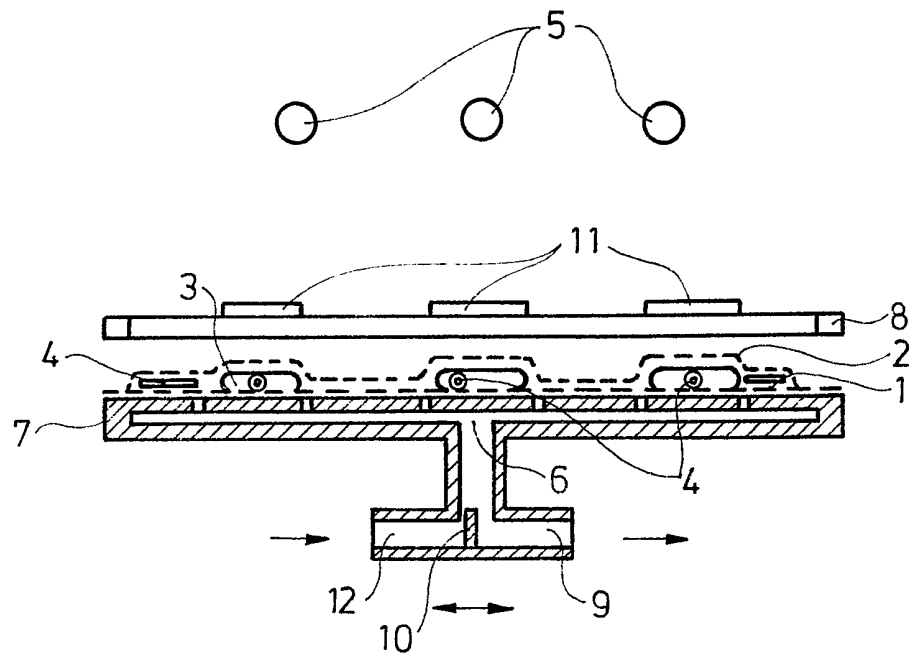


Fig.1

## SPECIFICATION

**Process for the airtight packing of products**

5 The invention relates to a process for the airtight packing of products, in the course of which the product is placed between a lower wrapping layer lying on a suction table and an upper airtight thermoplastic foil; between the suction table and upper foil a closed space is formed, thereafter by means of infra-red heating bodies arranged above the table, heat is transferred to the lower wrapping layer and the upper airtight thermoplastic foil; by means of the vacuum of the suction table the air is

10 sucked out from the space around the product. Several processes for packing different products are known, in which air is removed from the space between the product and the packing means in order to prolong storability of the product, to maintain its original quality and other characteristics important for the consumer.

As above-mentioned, a number of processes have been developed which can achieve the said criteria.

25 A packing process is also known in which air is removed from the space between the product and the packing material so that the product is placed into a bag made of a synthetic shrink-foil and the bag is dipped into hot water, whereby the foil bag is shrunk onto the product surface. While shrinking, the packing bag expels the air around the product and the packing material takes up the shape of the product, as is well-known in case of slaughtered dressed poultry.

35 A method of packing different products on a vacuum packing machine has been also widely used in which the product is placed in a synthetic bag into a vacuum chamber and the air is expelled by means of the vacuum.

40 Similar packing processes based on the suction method are described in DE-A-2 412 948 and in GB-A-1 422 375; in these, an uneven corrugated surface of the suction table is provided between the two foils, whereby in the course of contact, the two foils do not close as long as the air is not expelled through the openings in the uneven corrugated surface of the suction table.

A common disadvantage of said processes lies in that packing can be performed in several technological steps only, at the same time traces of air channels are left on the packing.

50 A similar solution can be realised by the process according to a patented Hungarian process known under the trademark of DIPACK-process, in which air is expelled from the closed space between two air-tight foils by a paraboloid effect induced in the closed space.

The aim of this invention is to eliminate the deficiencies of the prior art, i.e. further to develop the process elaborated for the airtight packing of products which can be characterised by a far better efficiency, compared to known solutions.

60 The task of the invention is to develop a process for the airtight packing of different products, in which wrapping foil is applied to the product by

suction, air is expelled from the product or the space between the product and the foil is filled with protective atmosphere; the packing thus obtained can be used for the simultaneous serial packing of products of different shapes and sizes.

70 The invention is based on the recognition that the aim may be solved if the lower foil is permanently fixed to the upper foil with the product therebetween and simultaneously a thermoplastic suction pipe lying between the two foil layers is softened; this way a packing without the traces of air channels can be obtained.

75 The aim is sought to be achieved in such a manner that in accordance with the invention between the product and the suction table a thermoplastic suction pipe is inserted; after welding said suction pipe to the upper air-tight thermoplastic foil and to the lower wrapping layer an airtight packing will be obtained.

80 In a preferred mode of performance of the process according to the invention the product and the space around it are filled with a protective atmosphere.

85 In a further preferred mode of performance, between the infra-red heating body and the upper airtight thermoplastic foil product, a protecting screen is inserted.

The process according to the invention will be described by some examples of actual operation and by the aid of the accompanying Figure.

90 *Figure 1* shows a side view of the elements of apparatus used for realizing the process according to the invention.

In the process according to the invention the product 3 to be packed is placed on a lower wrapping layer 1 which is arranged on a suction table 7. Between the product 3 and the edge of the suction table a suction pipe having several openings 4 is placed on the lower wrapping layer 1 in such a manner that an air channel is formed between the product and the edge of the suction table i.e. between the product and the suction openings. With the aid of a clamping frame 8 an airtight thermoplastic foil 2 is fixed above the suction table 7, the foil 2 forming the upper wrapping layer.

100 Between the suction table 7 and the upper foil 2 a closed space is formed.

105 With the aid of the infra-red heating bodies 5 in this preferred embodiment, the upper foil 2 is softened, while the air in the closed space below is heated through the upper foil 2. Warm air raises the upper foil quasiconically. After the expiration of a suitable period of time, the air is sucked from the closed space through the suction table 7 and the suction openings 6 therein. As a consequence, the upper foil 2 encloses the product 3 and adheres permanently to the lower foil 1; simultaneously with the aid of the suction pipe 4 air is sucked also from the product 3. Optionally, after having sucked out the air, the product is filled with a protective atmosphere. The duration of softening by heat depends on the material and the diameter, colour and wall-thickness of the suction pipe; utilising atmospheric pressure against the vacuum the upper foil 2 is pressed onto the lower layer 1. In this

manner there is obtained a packing consisting of the upper foil 2, the suction pipes 4 and the lower wrapping layer 1 with the product 3 sealed there-between. After cooling, the sealed state becomes

5 permanent.

In the case of a product 3 sensitive to heat, screens 11 between the heating bodies 5 and the upper foil 2 may be inserted which "follow" the shape of the product 3 to protect it. Thus, the

10 product 3 will not be damaged either during heat transfer or wrapping, nor is the quality of the product 3 negatively influenced.

In the packing process, the product 3 is enclosed by the upper foil 2 and the lower layer 1; with the aid of the suction pipes 4 air is sucked from the product 3 or after having sucked out the air it is filled with a protective atmosphere by reversing a valve 10.

In such a manner within one operative step an

20 aesthetic, mechanically solid, airtight packing (or one filled with a protective atmosphere) for disposable use can be obtained, based on the suction process.

In the field of the food industry, vacuum-packing or packing with a protective atmosphere represents a most economical solution for packing cheese, fish, meat, sausages etc.,

To facilitate understanding, below examples of particular modes of packing are given:

30 *Examples*

1. *Article to be packed: latch packing material:*

The upper wrapping material is a hard PVC, clear as water, the type ONGROFIL KTT (Trade Mark)

35 thickness: 0.2 mm; the lower foil is soft PVC, brick-red coloured, thickness: 0.12 mm, type ONGROFOL LFT (Trade Mark); the suction pipe is made of hard blue-coloured PVC, outer diameter: 3.2 mm; wall-thickness: 0.2 mm.

40 In the course of packing, the temperature of the upper foil amounts to 85°C.

Holding time: 6 s

Duration of vacuum: 8 s

Required vacuum: 20 mbar.

45 *Packing thus obtained:* the latch is enclosed by the upper wrapping foil in a permanent manner; from the inside of the latch air is sucked out by the vacuum pump; an aesthetic non-recurrent or disposable packing is obtained. The product is clearly

50 visible beneath the foil and it is protected against corrosion.

2. *Article to be packed: hard-rinded aromatic conical candy filled with raspberry*

55 *Packing material:* The upper wrapping foil is polypropylene with a PVdC coating, of the type BIAFOL (Trade Mark) clear as water and soft; thickness: 0.15 mm; the foil is printed in four colours; the lower foil is the same as the upper one.

60 The suction pipe is made of white hard PVC, outer diameter: 3.2 mm; the wall-thickness of the pipe: 0.2 mm.

In the course of packing the temperature of the upper foil is 90°C.

65 Holding time: 5 s

Duration of vacuum: 7 s

Required vacuum: 15 mbar.

*The packing thus obtained:* a glossy aesthetic and aroma-keeping packing under permanent vacuum, which keeps the goods in a fresh state.

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3. *Article to be packed: microelectronic memory unit*

*Packing material:* The upper wrapping foil is a

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Holding time: 6 s

Duration of vacuum: 8 s

Required vacuum: 10 mbar.

*The packing thus obtained:* Vacuum-treated packing, protecting against corrosion and mechanical influences, transparent from all sides; accessibility for measuring and connection is assured.

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4. *Goods to be packed: disposable medical syringe for non-recurrent use*

*Packing material:* The upper wrapping foil is POLYPROPYLENE with PVdC coating, hard, clear as water, of the type BIAFOL (Trade Mark) thickness 0.15 mm; the lower foil is the same as the upper one.

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Suction pipe is made of hard white PVC, outer diameter of the pipe: 3.2 mm; wall thickness: 0.3 mm;

In the course of packing, the temperature of the upper foil is 85°C with the goods being screened.

Holding time: 6 s

Duration of vacuum: 8 s

Filling with protective atmosphere: 2 s

Required vacuum: 15 mbar.

*The packing thus obtained* complies with requirements; it is a sterile disposable packing with protective atmosphere.

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The main advantage of the process according to the invention lies in that the goods preserve their original quality without any special protective means, accordingly scope of its application can be widened. A simple and economical packing process can be realised on traditional vacuum-forming machines. As unprocessed foils can be used as packing material, sort and size of the goods can be continuously changed without the necessity of switching over the machine. In the case of goods, the use of the process according to the invention enables a prolongation of period of storability; simple and sterile packing of medical instruments and means can be achieved. By using the process an aesthetic packing can be obtained, increasing the value of goods and applicable in a wide field.

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A special importance of the invention is in the field of microelectronics; it is a well-known fact that microelectronic components become easily oxidised in air, they are highly sensitive to dust and contamination, their thinnest elements are easily damaged under external influences. In the field of microelectronics, the invention is not only

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well suitable for transport packing but it yields a most simple economical and productive solution in the field of technological wrapping, with an additional high operational safety.

5 The traditional technological process of wrapping the microelements takes place by pressing, in vacuum chambers, heating furnaces and with very expensive material at the same time the percentage of waste is very high.

10 When using the process according to the invention, good technological protection and proper wrapping can be achieved in one single operational step instead of several interventions and, moreover, by using non-expensive unprocessed

15 materials.

In the field of therapeutics, germ-free and sterile goods can be packed in a more economical and simple manner than with the traditional technical solutions, examples of such goods being disposable syringes, and needles for non-recurrent use, surgical threads or sutures etc., Now these goods are packed in thin filter paper, thereafter for an extended period some hours they are sterilized in chambers filled with ABS gas, to allow the gas to penetrate to the goods through the filter paper and to have them sterilized. The main disadvantage of this process lies inter alia in that the paper is expensive and very thin, it becomes easily damaged and the process is time-consuming.

30 As already mentioned in connection with the examples, the product enclosed between two airtight foils requiring sterile conditions, is deaerated by means of the suction pipe and filled with a protective atmosphere (the so-called DIPACK-process).

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#### CLAIMS

1. A process for the airtight packing of products, in which the product is placed between a lower wrapping layer arranged on a suction table and an upper airtight thermoplastic foil, a frame is put on the upper airtight foil so that between the suction table and the upper foil a closed space is formed, thereafter by means of the heating bodies, heat is applied to the lower wrapping layer and the upper airtight thermoplastic foil, and vacuum is applied via the suction table to remove the air from the space around the product, wherein between the product and the suction table a suction pipe is inserted and after welding said pipe to the upper airtight thermoplastic foil and to the lower wrapping layer, an airtight packing will be obtained.

2. A process as claimed in claim 1, in which the product and the surrounding space are provided with a protective atmosphere through the suction pipe.

3. A process as claimed in claim 1 or 2, in which the heating body and the upper airtight thermoplastic foil screen elements are inserted for protecting the product against heat.

4. A process according to any preceding claim, wherein said suction pipe is of a thermoplastic material.

5. A process for the airtight packing of products substantially as herein described with reference to

any one of the Examples and/or as illustrated in the drawing.

6. A product package whenever made by the process claimed in any one of claims 1 to 5.

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