(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 382 132 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
13.02.2013 Bulletin 2013/07

(21) Application number: **09810781.6**

(22) Date of filing: **02.12.2009**

(51) Int Cl.:
B65B 9/04 *(2006.01)* ***B65B 25/00*** *(2006.01)*
B65B 55/04 *(2006.01)* ***B65B 59/04*** *(2006.01)*
B65B 55/02 *(2006.01)*

(86) International application number:
PCT/IB2009/007625

(87) International publication number:
WO 2010/064125 (10.06.2010 Gazette 2010/23)

(54) **PLANT FOR PACKAGING CONFECTIONARY PRODUCTS IN A STERILE MANNER**

ANLAGE ZUR STERILEN VERPACKUNG VON KONFEKT

USINE DE CONDITIONNEMENT STÉRILE DE FRIANDISES

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **03.12.2008 IT TO20080896**

(43) Date of publication of application:
02.11.2011 Bulletin 2011/44

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(56) References cited:
DE-A1- 1 436 022
DE-A1-102006 045 292
DE-U1- 20 305 759
US-A- 3 911 640
US-A- 4 860 519

EP 2 382 132 B1

Printed by Jouve, 75001 PARIS (FR)

Description

TECHNICAL FIELD

[0001] The present invention relates to a plant for packaging confectionary products in a sterile manner in sterile containers or packages.

[0002] In the foodstuffs industry, in general, and in the field of packaging of confectionary products in sterile containers, in particular, there is felt the need to package products in containers having formats different from one another. For said purpose, for each format, i.e., for each type of container, there is currently used a packaging plant "dedicated" to the specific container.

[0003] Each of said plants, commonly known as "form/fill/seal" and disclosed for example, in US 3.911, 640, comprises a plurality of stations, which are aligned with one another along a packaging path and are all housed within a common tunnel that defines a "sterile" area or rather an area controlled in its degree of bacteriological contamination in order to ensure the sterility of the packaging. Fed step by step through the aforesaid stations is a first thermoformable strip, which defines an end wall of the tunnel and, after being sterilized, is heated, in a purposely designed station, and then passes into a thermoforming station for making one or more housings or compartments designed to receive, each, at least one of the aforesaid products. The compartments with the products to be packaged inside are then sealed by means of a second strip that is also previously sterilized and that delimits at the top a terminal length of the aforesaid tunnel and is heat-sealed on the first strip before the various compartments are physically separated from one another in a dinking station.

BACKGROUND ART

[0004] Even though the known plants of the type described above are currently in use, since they are dedicated' to a given container, they present a "rigid" configuration and consequently cannot be drastically modified for producing containers that may even be very different from the ones originally envisaged. It is, however, possible to make partial modifications to the known plants, said modifications in any case requiring particularly long adaptation times and generating unacceptable losses in terms of downtime of the plant and, hence, of lack of production.

[0005] Furthermore, in known plants, precisely because they are dedicated, the width of the strips and the step of advance of the strips themselves are already determined in the design stage and optimized as a function of the dimensions, geometry and, in general, type of individual format or container originally conceived so that the change in format inevitably generates an increase in waste, i.e., in the amount of strips not used in the processes of thermoforming and/or closing, to such an extent as to render production less economically advantageous given, as is known, the high incidence of the cost of the strips on the overall cost of the packaged product.

[0006] The use of strips of different width on existing plants is ruled out by the fact that the strips delimit the sterile area and for this reason must be constantly coupled in a sealed way to a wide range of mechanical components of the plant, which would, in turn, have to undergo modifications or adaptations that entail insurmountable difficulties. For the reasons set forth above, each substantial change of format of the containers requires replacement of the entire packaging plant.

[0007] Change of formate of the containers is possible using the adjustable plant disclosed in DE 203 05 759U1.

DISCLOSURE OF INVENTION

[0008] The aim of the present invention is to provide a plant for packaging confectionary products in sterile containers, the constructional characteristics of which enable a simple and inexpensive solution of the problems set forth above.

[0009] According to the present invention a plant for packaging confectionary products in sterile containers is provided, the plant comprising, arranged along a packaging path, at least one first assembly for sterilization and heating of a first thermoformable strip, a forming assembly for making on said first strip at least one compartment for housing said confectionary products, an assembly for feeding a confectionary product into said compartment, a second assembly for sterilization and feed of a second closing strip towards said first strip, a welding sealing assembly for connecting together said strips and closing said confectionary product within said housing compartment, a cutting assembly for cutting said strips and making at least one said container, and a sterile duct extending along said packaging path and designed to contain a sterile gas, said duct being common to said assemblies and being delimited at least partially by said strips, the plant being characterized in that each said assembly forms part of a respective operating module that is independent of the other modules and coupled to the adjacent modules in a releasable way.

[0010] Preferably, in the plant defined above, each said module comprises a respective supporting frame that is independent of the supporting frames of the other modules, the frames supporting respective operating means designed to perform the specific function of said module and part of the frames themselves a respective half-shell casing distinct from the other casings and connected to the adjacent casings via releasable sealing means; each said casing delimiting a respective length of said sterile duct.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The invention will now be described with reference to the attached figures, which illustrate a non-limiting example of embodiment thereof and in which:

Figure 1 is a schematic perspective view of a preferred embodiment of the plant according to teachings of the present invention;

Figure 2 is similar to Figure 1 and illustrates the plant broken down into some of its constitutive elements;

Figure 3 illustrates, at an enlarged scale, a detail of Figures 1 and 2; and

Figure 4 illustrates, in perspective view, a component of the plant of Figures 1 and 2.

BEST MODE FOR CARRYING OUT THE INVENTION

[0012] In Figure 1, designated as a whole by 1 is a plant for packaging confectionary products in sterile containers. Here and in what follows by the term "confectionary products" is meant both products in a solid or granular form and products in the form of a liquid or a cream.

[0013] The plant 1 has a modular composition or is made up of units that are mutually independent, i.e., autonomous from the mechanical, electrical, electronic, pneumatic, and management standpoints. In the specific case, the plant 1 comprises, in succession along a packaging path P, a module 3 for feed and sterilization of a thermoformable strip 4, which is wound off a spool 5 and fed step by step along the packaging path P by drawing devices, which are known and not described in detail. The plant 1 then comprises a module 6 for heating of the thermoformable strip 4 and a module 7 for thermoforming of the thermoformable strip 4 itself. The module 7 provides on the strip 4 a plurality of housings or compartments 8 having dimensions and relative positioning determined in the design stage according to the product, the type of container to be made, and the width of the strip 4 itself.

[0014] Downstream of the module 7, in the direction of advance of the strip 4, the plant 1 further comprises a dispensing module 9 for feeding the product to be packaged into each of the housings or compartments 8, and a further module 10 for feed and sterilization of a heat-sealable strip 11 that can be wound off a spool 12 carried 'by the module 10 itself. Downstream of the module 10, the plant 1 further comprises a welding module 13 for welding the strip 11 onto the portion of the strip 4 not involved the previous thermoforming process so as to close in a fluid-tight way each of the housings or compartments 8, and a dinking module 14 for separating the various housings or compartments 8 from one another to form a plurality of sterile containers, which are fed towards an outlet 15 of the plant 1 by a conveyor belt 16 that forms part of the dinking module 14 itself.

[0015] Each of the modules 3, 6, 7, 9, 10, 13 and 14 comprises a respective operating assembly, which is in itself known; said assemblies are designated by 3a, 6a, 7a, 9a, 10a, 13a and 14a, respectively. The operating assemblies are pneumatically connected to a pneumatic source via dedicated valve assemblies of their own (not illustrated) and electrically connected to respective electronic control units 3b, 6b, 7b, 9b, 10b, 13b and 14b. The electronic control units 3b, 6b, 7b, 9b, 10b, 13b and 14b are each dedicated exclusively to the corresponding operating assembly 3a, 6a, 7a, 9a, 10a, 13a and 14a, are independent of one another, and are, in turn, electrically connected and controlled by a general control unit 18 for managing the entire plant 1.

[0016] Each module 3, 6, 7, 9, 10, 13 and 14 further comprises a respective structure or frame 3c, 6c, 7c, 9c, 10c, 13c and 14c for supporting the corresponding operating assembly 3a, 6a, 7a, 9a, 10a, 13a and 14a and the various electrical and pneumatic wiring/components; each frame 3c, 6c, 7c, 9c, 10c, 13c and 14c is separate from and independent of the other frames and is set alongside and coupled to the frames adjacent thereto in a releasable way, for example via fast-coupling assemblies (not visible in the attached figures). Each frame 3c, 6c, 7c, 9c, 10c, 13c and 14c is supported by a guide-and-slide assembly of its own, comprising a slide defined by a plurality of bottom resting feet or portions 20 (Figures 1 and 3) of the respective frame itself; in the particular example described, the portions 20 have respective bottom terminal seats 21 shaped like a U set upside down and engaged by a corresponding rectilinear guide 22 in a slidable way. The guide 22 forms part of the aforesaid guide-and-slide assembly and part of a rail 23 for relative positioning, which is common to all the modules 3, 6, 7, 9, 10, 13 and 14, extends parallel to the path P, and is stably fixed on the floor. In this way, each of the modules 3, 6, 7, 9, 10, 13 and 14 can be translated along the rail 23 and hence along the aforesaid packaging path P independently of the other modules and, in particular, can be uncoupled from the rail 23 itself and moved away by simple vertical lifting, as illustrated for the module 9 in Figure 2. Alternatively, according to a variant not illustrated, one or more modules have their respective frames arranged, each, on a respective motor-driven trolley or other equivalent means for movement of the module, designed to be controlled in position independently of the other trolleys, for displacement in a direction transverse to the aforesaid packaging path P, between an operative advanced position, in which the corresponding frame extends along the path P in a pre-determined position, and an extracted position, in which the frame is set outside of the packaging path P and in which the module does not take part in the packaging process.

[0017] Each of the frames supports an intermediate resting surface K, which is substantially coplanar to the surfaces K of the other frames, and on which the thermoformable strip 4 rests during its advance towards the outlet 15. In this way, the various surfaces K define at least part of a sliding guide for the thermoformable strip 4. At output from the dinking assembly 14, the containers are moved away via the conveyor belt 16.

[0018] Each of the frames arranged upstream of the sealing assembly 13 moreover supports a respective half-shell 3d, 6d, 7d, 9d and 10d, which is set only above the'corresponding resting surface K with its concavity

facing the corresponding plane surface K itself and is coupled to the half-shells adjacent to it in a releasable way via the interposition of respective gaskets or labyrinth seals designated by 25. In the particular example described, each half-shell 6d, 7d, 9d and 10d comprises a corresponding top wall 26 set facing, and superimposed only on, the corresponding plane resting surface K and vertically raised with respect to the corresponding plane surface K itself, and two side walls 27, which face one another and extend upwards once again starting from the respective flat resting surface K. Each of the top walls 26 has a size measured parallel to the corresponding surface K and orthogonal to the path P that can be varied as a function of the width of the thermoformable strip 4 and of the strip 11 and a through opening traversed by a mobile element of the respective operating assembly 6a, 7a, 9a, 10a. The side walls 27 terminate, instead, in the direction of the corresponding resting surface K, with respective portions, which, in the case in point, are L-shaped (Figures 2 and 4), to which the opposite longitudinal lateral portions of the thermoformable strip 4 are coupled in a slidable way so as to guarantee maintenance of an overpressure of the sterile environment within the tunnel. In this way, each half-shell 6d, 7d, 9d and 10d delimits, with a corresponding intermediate portion of the thermoformable strip 4, a respective length of a continuous tunnel 30 (Figure 4), which is closed upstream by the feed and sterilization assembly 3 and downstream by the closing strip 11, which progressively converges towards the underlying thermoformable strip 4 before being welded to the thermoformable strip 4 itself. Supplied into the tunnel 30 is sterile air and, in general, a sterile gas containing nitrogen at a variable pressure of between 0.01 and 1 bar to create a sterile environment, in which all the packaging operations are performed.

[0019] From the foregoing description, it is evident how the constructional characteristics of the plant 1 described and, in particular, the fact of using a plurality of modules or units completely independent of one another and autonomous from the mechanical, electrical, electronic, pneumatic, and management or control standpoints but that can be coupled to one another in a functional way enables, according to the needs, transformation in an extremely fast way and hence with reduced downtimes, of an existing packaging plant into a new plant for packaging a different type of product or for the production of different containers, maintaining the efficiency and reliability of the previous plant unvaried but, above all, reducing to a minimum the machining waste. What has just been set forth is basically the result of the fact that each one of the modules that make up the plant 1 is perfectly interchangeable or replaceable with another functionally equivalent module, i.e., a module that performs the same function as the replaced module and can be chosen from among a plurality of modules having constructional characteristics different from one another. By the term "constructional characteristics" is meant the characteristics of the module that enable variation of the type, i.e., geometry and/or dimensions, of the containers produced.

[0020] Furthermore, other features remaining the same, the fact of envisaging, for each of the modules 6,7,9 and 10, a corresponding adjustable half-shell for forming the sterile environment enables arbitrary variation of the transverse dimensions of the tunnel 30 and makes it hence possible to use thermoformable and closing strips of different width. In the particular example described, in fact, the half-shells provided enable use of thermoformable and closing strips of widths that vary in a percentage of $\pm 15\%$ with respect to a given width and hence optimization of the surface of the thermoformable strip 4, reducing to a minimum the waste resulting from dinking.

[0021] Finally, the fact of using a common guide rail and of coupling the different modules to the same rail in an axially slidable way makes it possible, on the one hand, to ensure always a precise positioning of the modules along the path P of advance, and on the other, to replace any of the modules by simply sliding the others along the rail. Furthermore, sliding along the rail enables replacement of an existing module with another module having a different longitudinal dimension, i.e., a dimension measured in the direction of the packaging path. In other words, the new module may be positioned in a space not necessarily identical to the one left free by the previous module. Furthermore, said implementation enables insertion of additional modules that are able to satisfy different working processes, e.g., working processes that comprise a number of a dispensing station.

[0022] From the foregoing description it emerges clearly that modifications and variations may be made to the plant 1 described, without thereby departing from the sphere of protection defined by Claim 1.

[0023] In particular, the plant 1 could comprise a number of modules different from the one indicated by way of example, and said modules could present frames or shapes that differ from the ones indicated once again by way of example.

[0024] Furthermore, the half-shells for obtaining the sterile environment could be provided in a way different from the one indicated by way of example once again in the perspective of facilitating transformation of the plant according to the widths of the strips to be used.

Claims

1. A plant (1) for packaging confectionary products in a sterile manner, the plant (1) comprising, arranged along a packaging path (P) at least one first sterilizing and heating assembly (3, 6) or a first thermo-formable strip (4), a forming assembly (7) for making on said first strip at least one compartment (8) for housing said confectionary products, a feeding assembly (9) for feeding a confectionary product in said compartment (8), a second sterilizing and feeding assembly (10) for feeding a second closing strip (11)

towards said first strip (4), a welding assembly (13) for reciprocally connecting said strips (4, 11) and closing said confectionary product within said housing compartment (8), a cutting assembly (14) for cutting said strips, and making at least one sterile container, and a continuous sterile duct (30) extending along said packaging path upstream said welding assembly (13) and adapted to contain a sterile gas, said duct (30) being in common to said assemblies and being at least partially delimited by said strips (4, 11) each said assembly forming part of a respective operating module (3), (6), (7), (9), (10), (13), (14) which is independent from the other modules and releasably coupled to the adjacent modules; said module comprising a respective supporting frame (3c), (6c), (7c), (9c), (10c), (13c), (14c) which is independent from the supporting frames, of the other modules and is set alongside the adjacent supporting frame; the frames supporting respective operating means adapted to serve the specific function of said respective module and some of the frames themselves supporting a respective half-shell casing (3d), (6d), (7d), (9d), (10d) different from the other casings and connected to the adjacent casings by releasable gaskets (25); each said casing delimiting a respective length of said continuous sterile duct (30); each said frame supporting a respective flat resting surface (k) different from the supporting surface defined by the other frames; said resting surfaces (k) forming distinct segments of a sliding guide for said first strip (4).

2. A plant according to claim 1, **characterized in that** each said half-shell casing comprises at least one side or upper wall (26) having adjustable dimensions.

3. A plant according to claim 2, **characterized in that** each said side wall is adjustable in a direction orthogonal to said packaging path (P).

4. A plant according to claim 2, **characterized in that** said side wall of each said half-shell extends in a position facing and exclusively over said related resting surface (k).

5. A plant according to any one of the preceding claims, **characterized in that** it comprises releasable positioning means (21) ,(22) for arranging and maintaining each of said modules in a respective functional position determined along said packaging path (P).

6. A plant according to claim 5, **characterized in that** said positioning means comprise, for each said module, a guide-and-slide assembly (21, 22) for moving each module along said packaging patih (P) independently from the other modules.

7. A plant according to claim 6, **characterized in that** said assemblies comprise a fixed guide (23) in common to all modules and parallel to said packaging path (P) and, for each said module, a respective slide (20) slidingly coupled to said common guide in opposite directions.

8. A plant according to claim 7, **characterized in that** each said slide (20) comprises at least one open seat (21) to couple with said guide; said seat and said guide being reciprocally uncouplable in a vertical uncoupling direction orthogonal to said guide to allow the respective module to be moved away from said packaging path (P).

9. A plant according to any one of the preceding claims, **characterized in that** each said module comprises its own dedicated electronic control unit (3b), (6b), (7b), (9b), (10b), (13b), (14b) which is independent from the other electronic units; said plant (1) further comprising a general electronic control unit (18) for managing said dedicated electronic units.

10. A plant according to any one of the preceding claims, **characterized in that** each said module comprises its own hydraulic and/or pneumatic members for joining to hydraulic and/or pneumatic networks, respectively, which are independent from the hydraulic/pneumatic joining members of the other modules.

11. A plant according to any one of the preceding claims, **characterized in that** each said module is interchangeable with one or more other modules, which may be chosen from a plurality of modules having different constructional features and same functions.

Patentansprüche

1. Anlage (1) zum Verpacken von Süßwaren auf eine sterile Weise, wobei die Anlage (1) angeordnet entlang eines Verpackungswegs (P) aufweist, wenigstens eine erste Sterilisations- und Erhitzungseinrichtung (3, 6) für einen ersten thermoformbaren Streifen (4), eine Ausformungseinrichtung (7) zum Herstellen wenigstens eines Fachs (8) an dem Streifen zum Aufnehmen der Süßwaren, eine Zufuhreinrichtung (9) zum Zuführen einer Süßware in das Fach (8), eine zweite Sterilisations- und Zufuhreinrichtung (10) zum Zuführen eines zweiten schließenden Streifens (11) zum ersten Streifen (4), eine Schweißeinrichtung (13) zum wechselseitigen Verbinden der Streifen (4, 11) und Schließen der Süßware in dem Aufnahmefach (8), eine Schneideinrichtung (14) zum Schneiden der Streifen und Herstellen wenigstens eines sterilen Behälters und eine kontinuierliche sterile Düse (30), die sich entlang des Verpackungswegs stromaufwärts bezüg-

lich der Schweißeinrichtung (13) erstreckt und angepasst ist, um ein steriles Gas zu enthalten, wobei die Düse (30) gemeinsam mit den Einrichtungen vorgesehen ist und wenigstens teilweise von den Streifen (4, 11) abgegrenzt ist, wobei jede der Einrichtungen einen Teil eines entsprechenden Funktionsmoduls (3, 6, 7, 9, 10, 13, 14) ausbildet, das unabhängig von den anderen Modulen ist und lösbar mit den benachbarten Modulen gekoppelt ist; wobei
das Modul einen entsprechenden Unterstützungsrahmen (3c, 6c, 7c, 9c, 10c, 13c, 14c) aufweist, der unabhängig von den Unterstützungsrahmen der anderen Module ist und entlang des benachbarten Unterstützungsrahmens vorgesehen ist; wobei die Rahmen entsprechende Funktionsmittel unterstützen, die angepasst sind, um der spezifischen Funktion des entsprechenden Moduls zu entsprechen, und einige der Rahmen selbst ein entsprechendes halbschalenförmiges Gehäuse (3d, 6d, 7d, 9d, 10d) unterstützen, das sich von den anderen Gehäusen unterscheidet und mit den benachbarten Gehäusen über entfernbare Dichtungen (25) verbunden ist; wobei jedes Gehäuse eine entsprechende Länge der kontinuierlichen sterilen Düse (30) abgrenzt; wobei jeder der Rahmen eine entsprechende flache Rastoberfläche (K) unterstützt, die sich von der Unterstützungsoberfläche unterscheidet, die von den anderen Rahmen definiert wird; wobei die Rastoberfläche (K) verschiedene Segmente einer Verschiebungsführung für den ersten Streifen (4) ausbildet.

2. Anlage nach Anspruch 1, **dadurch gekennzeichnet, dass** jedes der halbschalenförmigen Gehäuse wenigstens eine Seite oder eine obere Wand (26) aufweist, die einstellbare Abmessungen aufweist.

3. Anlage nach Anspruch 2, **dadurch gekennzeichnet, dass** jede der Seitenwände in einer Richtung senkrecht zum Verpackungsweg (P) einstellbar ist.

4. Anlage nach Anspruch 2, **dadurch gekennzeichnet, dass** die Seitenwand jeder Halbschale sich in einer Position erstreckt, die der entsprechenden Rastoberfläche (K) zugewandt ist, und sich ausschließlich darüber erstreckt.

5. Anlage nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** diese lösbare Positionierungsmittel (21, 22) zum Anordnen und Beibehalten jedes der Module in einer entsprechenden funktionalen Position aufweist, die entlang des Verpackungswegs (P) bestimmt ist.

6. Anlage nach Anspruch 5, **dadurch gekennzeichnet, dass** die Positionierungsmittel für jedes Modul eine Führungs- und Verschiebungseinrichtung (21, 22) zum Bewegen jedes Moduls entlang des Verpackungswegs (P) unabhängig von den anderen Modulen aufweisen.

7. Anlage nach Anspruch 6, **dadurch gekennzeichnet, dass** die Einrichtungen eine fixierte Führung (23) in Übereinstimmung mit allen Modulen und parallel zum Verpackungsweg (P) und für jedes Modul eine entsprechende Verschiebungseinheit (20) aufweisen, die verschiebbar mit der gemeinsamen Führung in entgegengesetzten Richtungen gekoppelt ist.

8. Anlage nach Anspruch 7, **dadurch gekennzeichnet, dass** jede Verschiebungseinheit (20) wenigstens einen offenen Sitz (21) zur Kopplung mit der Führung aufweist; wobei der Sitz und die Führung in einer vertikalen Entkopplungsrichtung senkrecht auf der Führung wechselseitig abkoppelbar sind, um dem entsprechenden Modul zu ermöglichen, von dem Verpackungsweg (P) wegbewegt zu werden.

9. Anlage nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** jedes Modul seine eigene zugeordnete elektronische Steuereinheit (3b, 6b, 7b, 9b, 10b, 13b, 14b) aufweist, die unabhängig von den anderen elektronischen Einheiten ist; wobei die Anlage (1) ferner eine allgemeine elektronische Steuereinheit (18) zum Verwalten der zugeordneten elektronischen Einheiten aufweist.

10. Anlage nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** jedes Modul seine eigenen hydraulischen und/oder pneumatischen Elemente zum jeweiligen Verbinden mit hydraulischen und/oder pneumatischen Netzwerken aufweist, die unabhängig von den hydraulischen/pneumatischen Verbindungselementen der anderen Module sind.

11. Anlage nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** jedes Modul mit einem oder mehreren anderen Modulen austauschbar ist, das aus mehreren Modulen ausgewählt werden kann, die unterschiedliche konstruktive Merkmale und gleiche Funktionen aufweisen.

Revendications

1. Usine (1) pour conditionner des friandises d'une manière stérile, l'usine (1) comprenant, agencé le long d'un chemin de conditionnement (P), au moins un premier ensemble de stérilisation et de chauffage (3, 6) pour une première bande thermoformable (4), un ensemble de formage (7) pour réaliser sur ladite première bande, au moins un compartiment (8) pour loger lesdites friandises, un ensemble d'alimentation (9) pour amener une friandise dans ledit compartiment (8), un second ensemble de stérilisation et

d'alimentation (10) pour amener une seconde bande de fermeture (11) vers ladite première bande (4), un ensemble de soudage (13) pour raccorder réciproquement lesdites bandes (4, 11) et enfermer ladite friandise à l'intérieur dudit compartiment de logement (8), un ensemble de découpe (14) pour découper lesdites bandes et réaliser au moins un contenant stérile, et un conduit stérile continu (30) s'étendant le long dudit chemin de conditionnement en amont dudit ensemble de soudage (13) et adapté pour contenir un gaz stérile, ledit conduit (30) étant commun auxdits ensembles et étant au moins partiellement délimité par lesdites bandes (4, 11), chacun desdits ensembles faisant partie d'un module de commande respectif (3), (6), (7), (9), (10), (13), (14) qui est indépendant des autres modules et couplé de manière détachable aux modules adjacents ; ledit module comprenant un châssis de support respectif (3C), (6C), (7C), (9C), (10C), (13C), (14C) qui est indépendant des châssis de support des autres modules, et est placé le long du châssis de support adjacent ; les châssis supportant des moyens de commande respectifs conçus pour remplir la fonction spécifique dudit module respectif et certains des châssis eux-mêmes supportant une enveloppe à demi-coque respective (3d), (6d), (7d), (9d), (10d) différente des autres enveloppes et raccordée aux enveloppes adjacentes par des joints détachables (25) ; chacune desdites enveloppes délimitant une longueur spécifique dudit conduit stérile continu (30) ;

chacun desdits châssis supportant une surface de repos plate (k) respective différente de la surface de support définie par les autres châssis ; lesdites surfaces de repos (k) formant des segments distincts d'un guide coulissant pour ladite première bande (9).

2. Usine selon la revendication 1, **caractérisée en ce que** chaque enveloppe à demi-coque comprend au moins une paroi latérale ou paroi supérieure (26) ayant des dimensions ajustables.

3. Usine selon la revendication 2, **caractérisée en ce que** chacune desdites parois latérales est ajustable dans une direction orthogonale par rapport audit chemin de conditionnement (P).

4. Usine selon la revendication 2, **caractérisée en ce que** ladite paroi latérale de chacune desdites demi-coques s'étend dans une position en vis-à-vis et exclusivement sur ladite surface de repos (k) relative.

5. Usine selon l'une quelconque des revendications précédentes, **caractérisée en ce qu'**elle comprend des moyens de positionnement amovibles (21, 22) pour agencer et maintenir chacun desdits modules dans une position fonctionnelle respective déterminée le long dudit chemin de conditionnement (P).

6. Usine selon la revendication 5, **caractérisée en ce que** lesdits moyens de positionnement comprennent, pour chacun desdits modules, un ensemble de guide et de glissière (21, 22) pour déplacer chaque module le long dudit chemin de conditionnement (P) indépendamment des autres modules.

7. Usine selon la revendication 6, **caractérisée en ce que** lesdits ensembles comprennent un guide fixe (23) commun à tous les modules et parallèle audit chemin de conditionnement (P) et, pour chacun desdits modules, une glissière (20) respective couplée de manière coulissante audit guide commun dans des directions opposées.

8. Usine selon la revendication 7, **caractérisée en ce que** chacune desdites glissières (20) comprend au moins un siège ouvert (21) pour se coupler avec ledit guide ; ledit siège et ledit guide pouvant être découplé réciproquement dans une direction de découplage verticale, orthogonale audit guide pour permettre d'éloigner le module respectif dudit chemin de conditionnement (P).

9. Usine selon l'une quelconque des revendications précédentes, **caractérisée en ce que** chacun desdits modules comprend sa propre unité de commande électronique dédiée (3b), (6b), (7b), (9b), (10b), (13b), (14b) qui est indépendante des autres unités électroniques ; ladite usine (1) comprenant en outre une unité de commande électronique générale (18) pour gérer lesdites unités électroniques dédiées.

10. Usine selon l'une quelconque des revendications précédentes, **caractérisée en ce que** chacun desdits modules comprend ses propres éléments hydrauliques et/ou pneumatiques pour l'assemblage aux réseaux hydrauliques et/ou pneumatiques, respectivement, qui sont indépendants des éléments d'assemblage hydrauliques/pneumatiques des autres modules.

11. Usine selon l'une quelconque des revendications précédentes, **caractérisée en ce que** chacun desdits modules est interchangeable avec un ou plusieurs autres modules, qui peuvent être choisis à partir d'une pluralité de modules ayant différentes caractéristiques de construction et les mêmes fonctions.

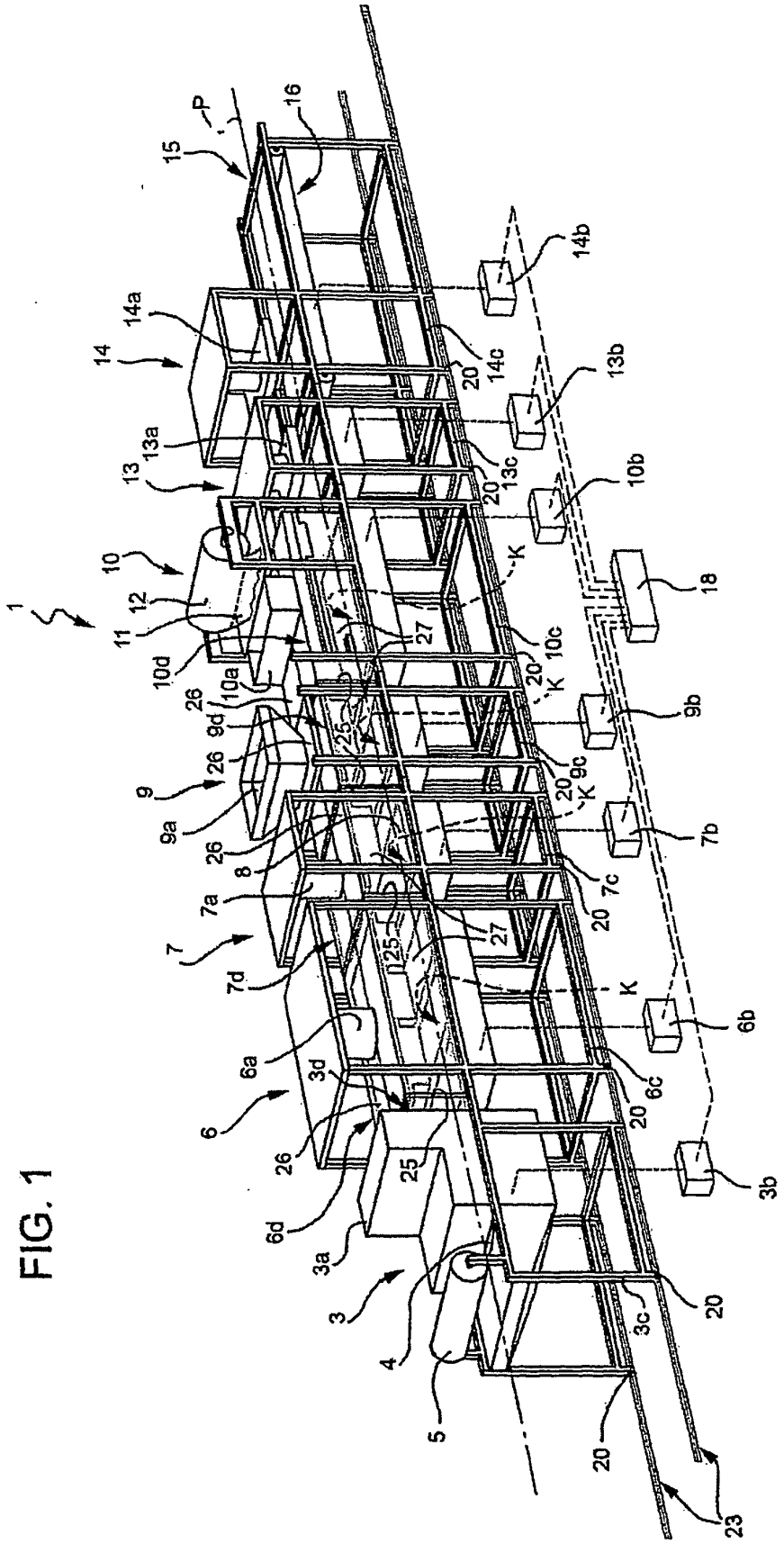
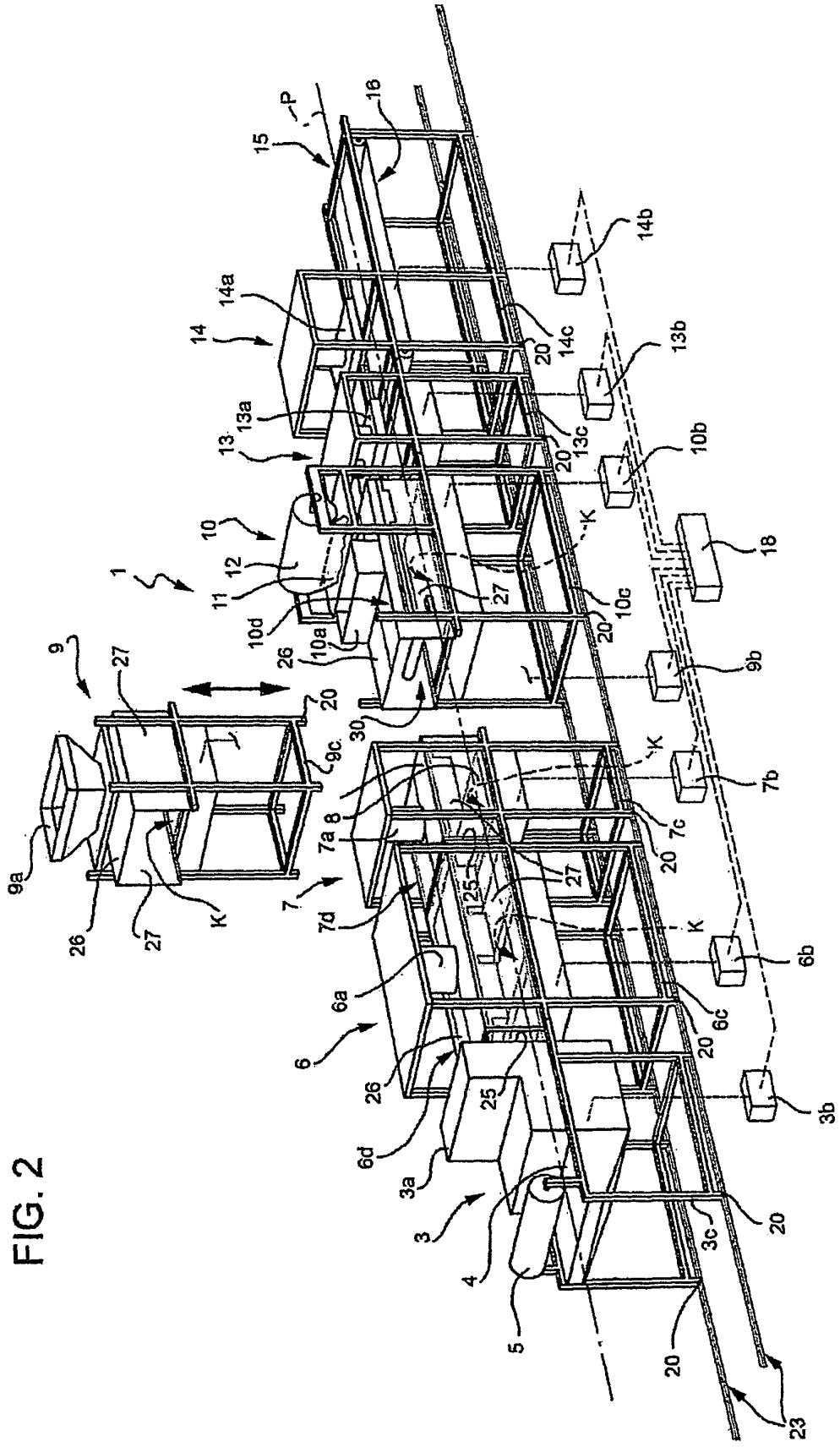

1
2
3
3a
3b
3c
3d
4
5
6
6a
6b
6c
6d
7
7a
7b
7c
7d
8
9
9a
9b
9c
9d
10
10a
10b
10c
10d
11
12
13
13a
13b
13c
14
14a
14b
14c
15
16
18
20
23
25
26
27
K
P

FIG. 1


P
15
16
14b
14a
14
14c
20
13b
13a
13
13c
10b
10
12
11
1
K
18
27
10d
10c
26
10a
9
9b
30
9c
7b
8
7a
7c
9a
7
7d
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6a
6
6c
6d
3b
3a
3
4
3c
5
23

FIG. 2

FIG. 3

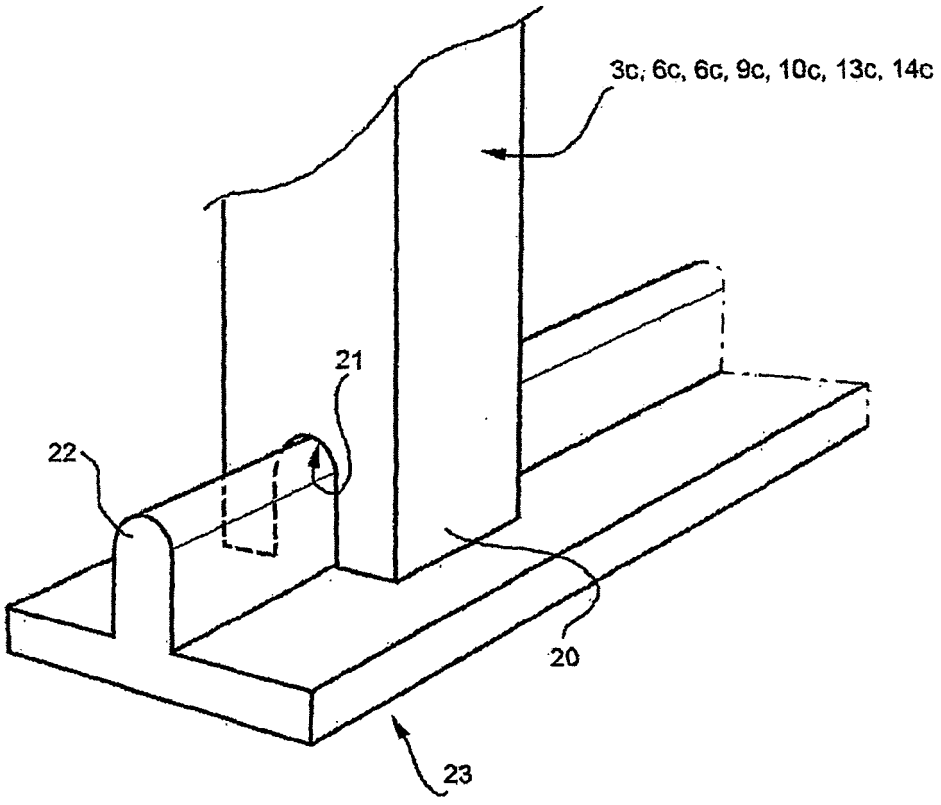
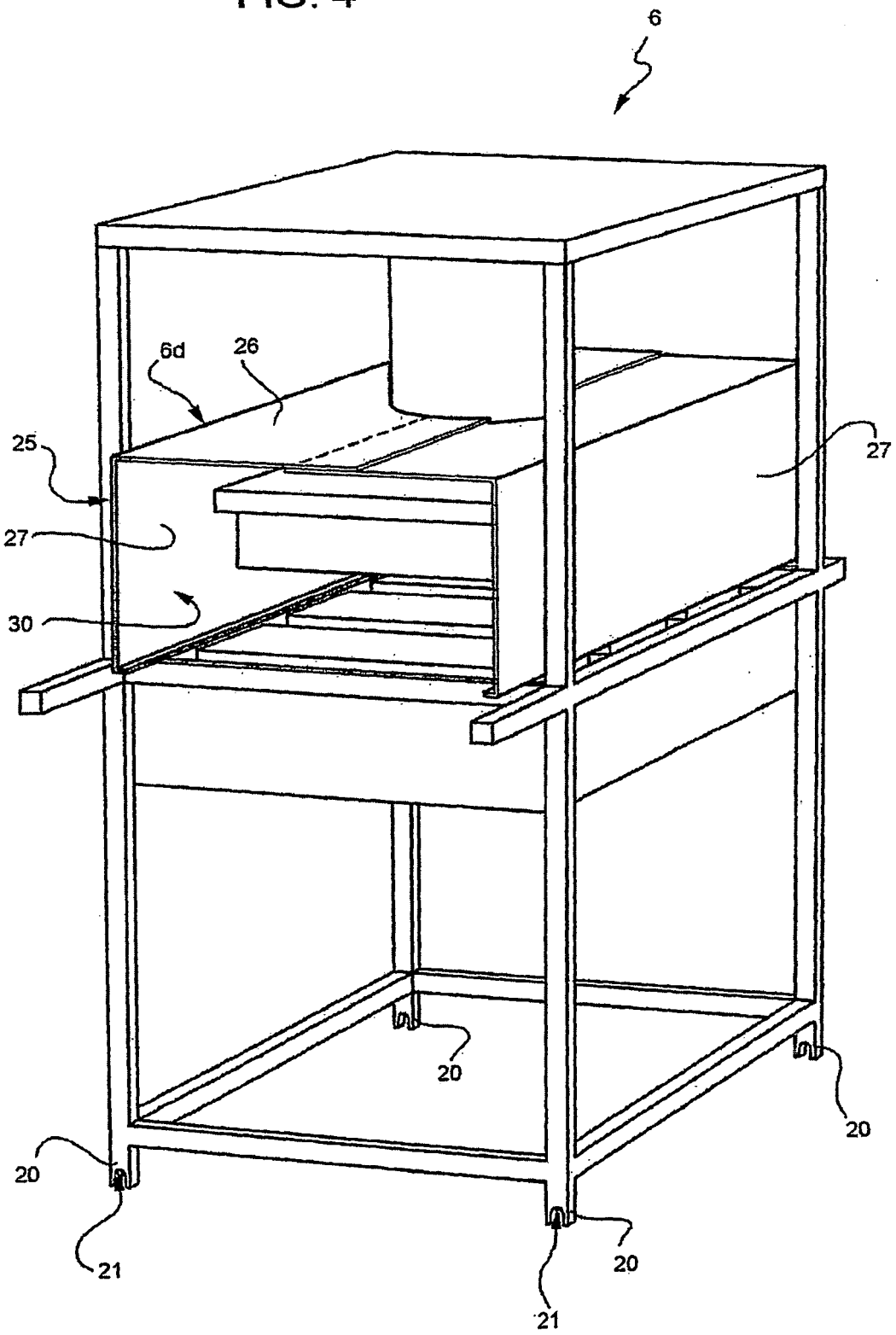


FIG. 4



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 3911640 A **[0003]**
- DE 20305759 U1 **[0007]**