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(54) **Method and apparatus for vacuum and/or protective atmosphere packaging**

Verfahren und Vorrichtung zur Verpackung in Vakuum und/oder Schutzgasatmosphäre

Procédé et appareil pour emballer sous vide et/ou atmosphère protectrice

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Description

[0001] The present invention refers in general to the field of vacuum and/or protective atmosphere packaging and in particular to a method and to an apparatus for packaging products, in particular food products, in a vacuum and/or in a protective atmosphere.

[0002] There are currently known in the art systems for vacuum and protective atmosphere packaging that provide for the use of containers in the form of thermoformed plastic trays open at the top. Such a tray is filled with the product to be packaged, the air is evacuated to create the vacuum and it may be filled with gas to create a protective atmosphere. Finally, the tray is closed and sealed by means of a plastic film.

[0003] Said packaging system according to the prior art has various drawbacks. In fact, once the tray is opened by the end user by removing the covering film, the contents of the tray must be consumed because the tray cannot be closed again.

[0004] US 3,481, 100 discloses a method and an apparatus for packaging products in protective atmosphere into a package comprising a container hermetically sealed by a portion of a thin, flexible sheet.

[0005] Preferably, the package further comprises an inner cover, not sealed to the container, which is formed separated from the container, is gripped by a reciprocating head and is deposited on the container before sealing it through said portion of a thin, flexible sheet.

[0006] The object of the present invention is to overcome the drawbacks of the prior art by providing a method for vacuum and/or protective atmosphere packaging that is versatile, efficient and able to allow high-speed, continuous production.

[0007] This object is achieved in accordance with the invention with the method listed in appended independent claim 1.

[0008] Another object of the invention is to provide an apparatus for vacuum and/or protective atmosphere packaging that is simple to make.

[0009] This object is achieved according to the invention with the apparatus listed in appended independent claim 5.

[0010] Advantageous embodiments of the invention are apparent from the dependent claims.

[0011] The peculiar characteristic of the invention is represented by the use of a container comprising a tray with a lid integral with/hinged to the tray. In this manner closing of the container takes place simply by lowering the lid on the tray. For this purpose the process of packaging must provide a first stage of semi-closing of the lid so as to leave a gap for removal of the air and/or for introduction of gas into the container, and a second stage of complete closing of the lid and of heat-sealing or sealing thereof to avoid tampering with the container and/or the product.

[0012] Such a package according to the invention offers the end user the possibility of opening and of sub-

sequently closing it by wedging of the lid into the tray.

[0013] Further characteristics of the invention will be made clearer by the detailed description that follows referring to purely exemplary and therefore non limiting embodiment thereof illustrated in the appended drawings, in which:

- Figure 1 is a diagrammatic top plan view of the apparatus for packaging in a vacuum and/or in a protective atmosphere according to the invention;
- Figure 1A is an enlarged detail, enclosed in the circle A of Figure 1, better illustrating the arrangement of the containers on the apparatus of Figure 1;
- Figure 2 is a longitudinal sectional view of the apparatus according to the invention, taken along the section plane II-II of Figure 1;
- Figure 2B is an enlarged detail, enclosed in the circle B of Figure 2, which better illustrates the arrangement of the containers on the apparatus of Figure 2; and
- Figure 3 is a longitudinal sectional view like Figure 2, illustrating the apparatus according to the invention, completed with a reel of plastic film for sealing of containers without a lid.

[0014] An apparatus for packaging in a vacuum and/or in a protective atmosphere according to the invention, denoted as a whole with reference numeral 1, is described with reference to Figures 1 and 2.

[0015] The apparatus 1 comprises a conveying station 2, a filling station 6, a semi-closing station 3, a station 4 for creating the vacuum and/or the protective atmosphere and for heat-sealing and a discharging station 5.

[0016] The conveying station 2 comprises a horizontal conveyor belt 20 supported by a main frame 21 resting on the ground. A plurality of containers 100, able to contain the products destined to be put in a vacuum and/or in a protective atmosphere, is fed on the conveyor belt 20.

[0017] As shown better in Figures 1A and 2B, according to the invention each container 100 is a tray 101 of thermoformed plastic material, open at the top.

[0018] A lid 103, able to close the tray 101 hermetically, is connected integrally to a portion 102 of the upper edge of the tray 101. In this manner the connecting portion 102 behaves as a hinge and the lid 103, rotating around the hinging axis 102, can pass from an opening position to a closing position of the tray 101.

[0019] The lid 103 is thermoformed together with the tray 101 and in normal conditions the lid 103 remains in the open position with respect to the tray 101.

[0020] The upper edge of the tray 101 and the peripheral edge of the lid 103 are able to engage mutually with each other by interference, to maintain the lid 103 in the closing position.

[0021] As shown in Figures 1 and 2, the empty containers 100 are conveyed from the conveyor belt 20 toward the filling station 6, disposed in two parallel rows, with the lids 103 completely open and disposed towards

the outside. Even if in the Figures the containers 100 are shown disposed on two rows, they can be disposed on one or more rows.

[0022] The conveyor 20 has two side bars 23 integral with the sides of its frame. The side bars 23 are parallel to each other and horizontal. In this manner the lids 103 of the containers as they pass through the filling station 6 remain above the horizontal side bars 23.

[0023] Special means (per se known and therefore not shown in the figures) suitable to fill the trays 101 with the products destined to be packaged will be provided in the filling station 6. Clearly filling of the trays 101 can also take place manually.

[0024] The filled containers 100 continue their transfer on the conveyor belt 20 towards the semi-closing station 3. During this transfer the side bars 23 of the conveyor continue with two guide bars 31, convergent and inclined upwards. In this manner the bars 31 cause raising of the lids 103 of the containers bringing them towards the closing position.

[0025] As a result, in the semi-closing station 3 a partial closing of the lid 103 on the tray 101 occurs, so as to leave a gap between the lid 103 and the upper edge of the tray 101 able to allow the discharge of air from the container and/or the introduction of gas into the container 100.

[0026] Semi-closing of the container 100 takes place by means of shaped guides 34 suitably inclined downwards or by means of mechanical or pneumatic actuators 32 which are responsible for lowering the lid 103 onto the tray 101.

[0027] At this point the filled and semi-closed containers 100 continue on the conveyor belt 20 towards the station 4 for creating a vacuum and/or a protective atmosphere and for heat-sealing. During this transfer, the lids 103 of the containers remain beneath the parallel horizontal bars 33 which serve to keep the lids 103 in their semi-closed position.

[0028] In the station 4 for creating a vacuum and/or a protective atmosphere and for heat-sealing there is provided a press comprising a lower half-mould 41 and an upper half-mould 42. On the upper half-mould 42, pneumatic means 43 for suction and introduction of gas and thermal means 44 for heat-sealing are provided.

[0029] The suction means 43 suck the air from the inside of the container 100 so as to create the vacuum.

[0030] The introduction means 43, on the other hand, introduce suitable gases into the container so as to create a protective atmosphere. According to the characteristics of the product contained in the containers 100, gases such as oxygen O₂, carbon dioxide CO₂ or nitrogen N₂ can be introduced.

[0031] After the protective atmosphere has been created inside the container 100, in the station 4 for creating a vacuum and/or a protective atmosphere and for heat-sealing, the edge of the container 100 is sandwiched between the lower half-mould 41 and the upper half-mould 42, closed hermetically and sealed by means of the ther-

mal heat-sealing means 44, so as to avoid tampering with the container 100 and the product, before it reaches the end user.

[0032] The container 100 is made of particular plastic materials (easy open) which allow heat-sealing and easy opening of the container 100. In this way, if the consumer intends to use up the product in more than one time, there is the possibility of closing again by wedging the lid 103 of the container.

[0033] As shown in Figure 3, the apparatus 100 can provide a reel 70 of plastic film 71 which can be used in a per se known manner for closing of the trays 101, if said trays are not provided with a reclosable lid. The reel 70 is disposed above and upstream of the station 4 for creating a vacuum and/or a protective atmosphere and for heat-sealing, whilst the waste film 71' is collected by a winder 42 disposed downstream of the station 4.

[0034] On leaving the station 4 for creating a vacuum and/or a protective atmosphere and for heat-sealing, the product is perfectly packaged in a vacuum and/or in a protective atmosphere inside the container 100. The container 100 is then discharged from the apparatus 1 through a slide 50 or a conveyor belt of the discharge station 5 to be sent for transport and/or storage.

[0035] Numerous variations and modifications of detail within the reach of a person skilled in the art can be made to the present embodiment of the invention without departing from the scope of the invention as set forth in the appended claims.

Claims

1. A method for packaging products, in particular food products, in a vacuum and/or a protective atmosphere, comprising the following steps:

- feeding of a plurality of containers (100) separated from each other and comprising a tray (101) and a lid (103) integrally connected to said tray (101) through a hinging axis (102),
- introducing the product to be packaged into the tray (101),
- partial closing the lid (103) on said tray (101) by rotating the lid (103) around said hinging axis (102) so as to leave a gap between said lid (103) and said tray (101) for discharging air from said container (100) and/or for introducing gas into said container (100),
- sucking air and/or introducing gas from/into said container (100), and
- complete closing the lid (103) on said tray (101) by further rotating the lid (103) around said hinging axis (102) and sealing the lid (103) on the tray (101) to close the container (100) hermetically and to avoid tampering with the product.

2. A method according to claim 1, characterised in

that said step of complete closing the lid (103) on the tray (101) provides for a closure by wedging.

3. A method according to claim 1 or 2, **characterised in that** said step of sealing the lid (103) on the tray (101) involves sealing on plastic materials (easy open) to allow sealing with easy opening of the container (100). 5
4. A method according to any one of the preceding claims, **characterised in that** said step of introducing gas into the container (100) provides for the introduction of gases such as oxygen O₂, carbon dioxide CO₂, or nitrogen N₂. 10
5. An apparatus (1) for packaging products, in particular food products, in a vacuum and/or in a protective atmosphere, comprising: 15
 - a conveying station (2) for conveying containers (100) separated from each other and comprising a tray (101) and a lid (103) integrally connected to the tray (101) through a hinging axis (102), 20
 - a filling station (6) for introducing the product to be packaged into the tray (101), 25
 - a station (3) for partial closing said lid (103) on said tray (101) by rotating the lid (103) around said hinging axis (102) so as to leave a gap between said lid (103) and said tray (101) for discharging air from said container (100) and/or for introducing gas into said container (100); 30
 - a station (4) for sucking air and/or for introducing gas from/into said container (100), for complete closing the lid (103) on said tray (101) by further rotating the lid (103) around said hinging axis (102) and for sealing the lid (103) on the tray (101) to close the container (100) hermetically and to avoid possible tampering. 35
6. An apparatus according to claim 5, **characterised in that** said station for partial closing the lid (103) on the tray (101) comprises guide means (31, 34) and/or actuator means (32) to bring the lid (103) close to the tray (101). 40
7. An apparatus according to claim 5 or 6, **characterised in that** it comprises means (33) for maintaining said lid (103) in a semi-closed position on said tray (101), disposed upstream of said station (4) for creating a vacuum and/or a protective atmosphere and for sealing. 45
8. An apparatus according to any one of claims 5 to 7, **characterised in that** it further comprises a reel (70) of plastic film (71) and sealing means to apply said film (71) to trays (101) without lids (103). 50

Patentansprüche

1. Verfahren zum Verpacken von Produkten, insbesondere Lebensmittelprodukten, in einem Vakuum und/oder einer Schutzgasatmosphäre, umfassend die folgenden Schritte:
 - Zuführen einer Mehrzahl von Behältern (100), die voneinander getrennt sind und eine Schale (101) und einen Deckel (103) umfassen, der mit der Schale (101) durch eine Scharnierachse (102) einstückig verbunden ist,
 - Einführen des zu verpackenden Produkts in die Schale (101),
 - teilweises Schließen des Deckels (103) auf der Schale (101) durch derartiges Drehen des Deckels (103) um die Scharnierachse (102), dass ein Spalt zwischen dem Deckel (103) und der Schale (101) zum Ausstoßen von Luft aus dem Behälter (100) und/oder zum Einführen von Gas in den Behälter (100) gelassen wird,
 - Absaugen von Luft aus dem und/oder Einführen von Gas in den Behälter (100); und
 - vollständiges Schließen des Deckels (103) auf der Schale (101) durch Weiterdrehen des Deckels (103) um die Scharnierachse (102) und Versiegeln des Deckels (103) auf der Schale (101), um den Behälter (100) hermetisch abzuschließen und eine Manipulation des Produkts zu vermeiden.
2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** der Schritt des vollständigen Schließens des Deckels (103) auf der Schale (101) ein Verschließen durch Keilverbindung vorsieht.
3. Verfahren nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Schritt des Versiegeln des Deckels (103) auf der Schale (101) ein Versiegeln auf Kunststoffmaterialien (leicht zu öffnen) umfasst, um ein Versiegeln bei leichtem Öffnen des Behälters (100) zu ermöglichen.
4. Verfahren nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Schritt des Einführens von Gas in den Behälter (100) die Einführung von Gasen wie beispielsweise Sauerstoff O₂, Kohlendioxid CO₂ oder Stickstoff N₂ vorsieht.
5. Vorrichtung (1) zum Verpacken von Produkten, insbesondere Lebensmittelprodukten, in einem Vakuum und/oder in einer Schutzgasatmosphäre, umfassend die folgenden Schritte:
 - eine Förderstation (2) zum Befördern einer Mehrzahl von Behältern (100), die voneinander getrennt sind und eine Schale (101) und einen

- Deckel (103) umfassen, der mit der Schale (101) durch eine Scharnierachse (102) einstückig verbunden ist,
- eine Füllstation (6) zum Einführen des zu verpackenden Produkts in die Schale (101),
 - eine Station (3) zum teilweisen Schließen des Deckels (103) auf der Schale (101) durch derartiges Drehen des Deckels (103) um die Scharnierachse (102), dass ein Spalt zwischen dem Deckel (103) und der Schale (101) zum Ausstoßen von Luft aus dem Behälter (100) und/oder zum Einführen von Gas in den Behälter (100) gelassen wird,
 - eine Station (4) zum Absaugen von Luft aus dem und/oder Einführen von Gas in den Behälter (100), zum vollständigen Schließen des Deckels (103) auf der Schale (101) durch Weiterdrehen des Deckels (103) um die Scharnierachse (102) und zum Versiegeln des Deckels (103) auf der Schale (101), um den Behälter (100) hermetisch abzuschließen und eine mögliche Manipulation zu vermeiden.
6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** die Station zum teilweisen Schließen des Deckels (103) auf der Schale (101) Führungsmittel (31, 34) und/oder Betätigungsmittel (32) umfasst, um den Deckel (103) der Schale (101) zu nähern.
7. Vorrichtung nach Anspruch 5 oder 6, **dadurch gekennzeichnet, dass** sie Mittel (33) zum Halten des Deckels (103) in einer halbgeschlossenen Position auf der Schale (101) umfasst, die vor der Station (4) zum Erzeugen eines Vakuums und/oder einer Schutzgasatmosphäre und zum Versiegeln angeordnet sind.
8. Vorrichtung nach einem der Ansprüche 5 bis 7, **dadurch gekennzeichnet, dass** sie ferner eine Rolle (70) von Kunststofffilm (71) und Versiegelungsmittel zum Aufbringen des Films (71) auf Schalen (101) ohne Deckel (103) umfasst.
- Revendications**
1. Méthode pour l'emballage de produits, en particulier de produits alimentaires, dans une atmosphère sous vide et/ou protectrice, comprenant les étapes suivantes :
- apport d'une pluralité de conteneurs (100) séparés les uns des autres et comprenant un plateau (101) et un couvercle (103) relié intégralement audit plateau (101) par un axe de pivotement (102),
 - disposition du produit à emballer sur le plateau (101),
 - fermeture partielle du couvercle (103) sur ledit plateau (101), en faisant tourner le couvercle (103) autour dudit axe de pivotement (102), de manière à laisser un espace entre ledit couvercle (103) et ledit plateau (101), afin d'évacuer de l'air dudit conteneur (100) et/ou introduire du gaz dans ledit conteneur (100),
 - aspiration d'air et/ou introduction de gaz à partir dudit/dans ledit conteneur (100), et
 - fermeture complète du couvercle (103) sur le plateau (101), par une rotation supplémentaire du couvercle (103) autour dudit axe de pivotement (102), et scellement du couvercle (103) sur le plateau (101) pour fermer le conteneur (100) hermétiquement et éviter la modification du produit.
2. Méthode selon la revendication 1, **caractérisée en ce que** ladite étape de fermeture complète du couvercle (103) sur le plateau (101) prévoit une fermeture par coincement.
3. Méthode selon la revendication 1 ou 2, **caractérisée en ce que** ladite étape de scellement du couvercle (103) sur le plateau (101) implique le scellement sur des matières plastiques (ouverture facile) pour permettre le scellement avec une ouverture facile du conteneur (100).
4. Méthode selon l'une quelconque des revendications précédentes, **caractérisée en ce que** ladite étape d'introduction de gaz dans le conteneur (100) prévoit l'introduction de gaz tels que l'oxygène O₂, le dioxyde de carbone CO₂ ou le nitrogène N₂.
5. Appareil (1) pour l'emballage de produits, en particulier de produits alimentaires, dans une atmosphère sous vide et/ou protectrice, comprenant :
- une station de transport (2) pour transporter des conteneurs (100) séparés les uns des autres et comprenant un plateau (101) et un couvercle (103) intégralement relié au plateau (101) par un axe de pivotement (102),
 - une station de remplissage (6) pour la disposition du produit à emballer sur le plateau (101),
 - une station (3) pour la fermeture partielle dudit couvercle (103) sur ledit plateau (101), par une rotation du couvercle (103) autour dudit axe de pivotement (102), de manière à laisser un espace entre ledit couvercle (103) et ledit plateau (101), afin d'évacuer de l'air à partir dudit conteneur (100) et/ou d'introduire un gaz dans ledit conteneur (100) ;
 - une station (4) pour l'aspiration de l'air et/ou l'introduction d'un gaz à partir dudit/dans ledit conteneur (100), afin de fermer complètement

le couvercle (103) sur ledit plateau (101), par une rotation supplémentaire du couvercle (103) autour dudit axe de pivotement (102), et pour le scellement du couvercle (103) sur le plateau (101), afin de fermer hermétique du conteneur (100) et d'éviter une éventuelle modification du produit. 5

6. Appareil selon la revendication 5, **caractérisé en ce que** ladite station pour la fermeture partielle du couvercle (103) sur le plateau (101) comprend des moyens de guidage (31, 34) et/ou des moyens d'actionnement (32) pour rapprocher le couvercle (103) du plateau (101). 10

7. Appareil selon la revendication 5 ou 6, **caractérisé en ce qu'il** comprend un moyen (33) pour maintenir ledit couvercle (103) dans une position semi-fermée sur le plateau (101), disposé en amont de ladite station (4) destinée à créer une atmosphère sous vide et/ou protectrice et au scellement. 15 20

8. Appareil selon l'une quelconque des revendications 5 à 7, **caractérisé en ce qu'il** comprend en outre un rouleau (70) de film plastique (71) et des moyens de scellement, pour appliquer ledit film (71) sur les plateaux (101) sans couvercles (103). 25

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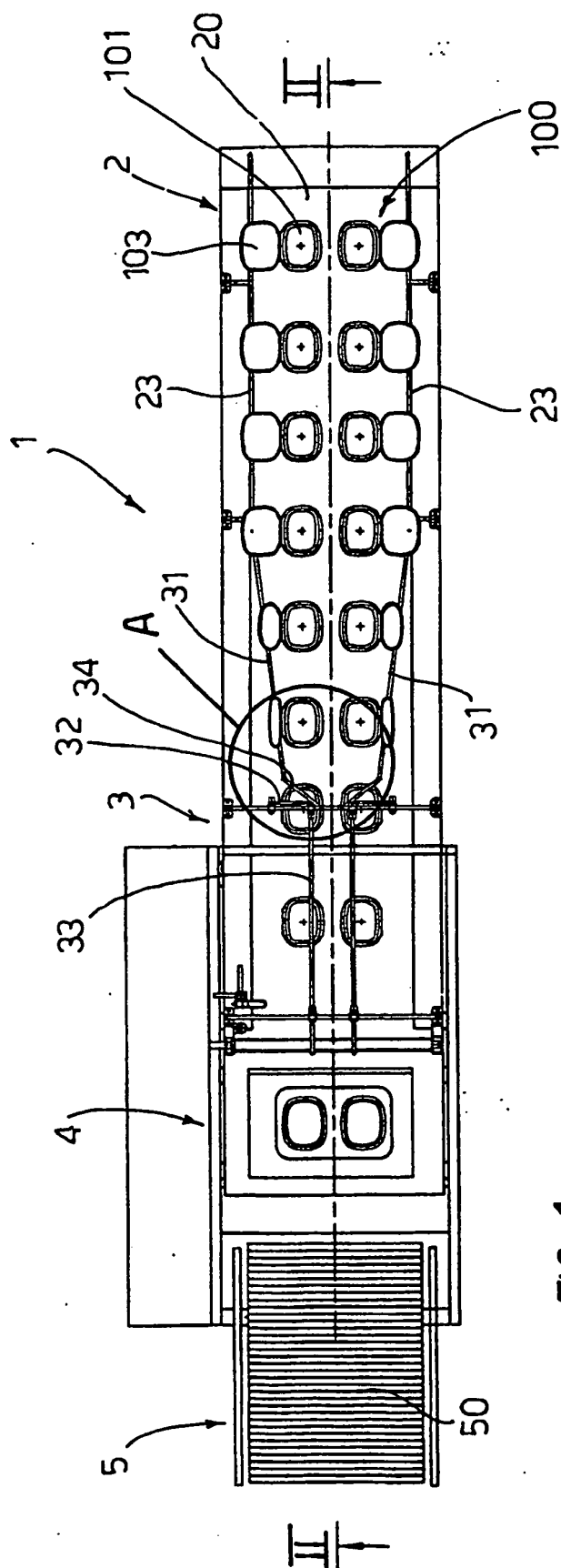


FIG. 1

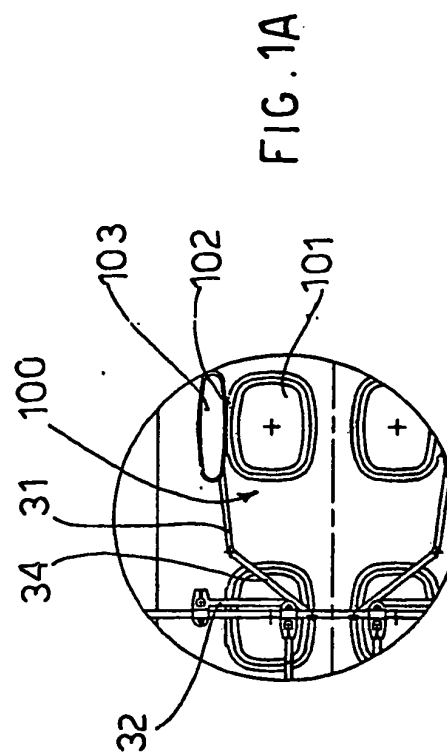


FIG. 1A

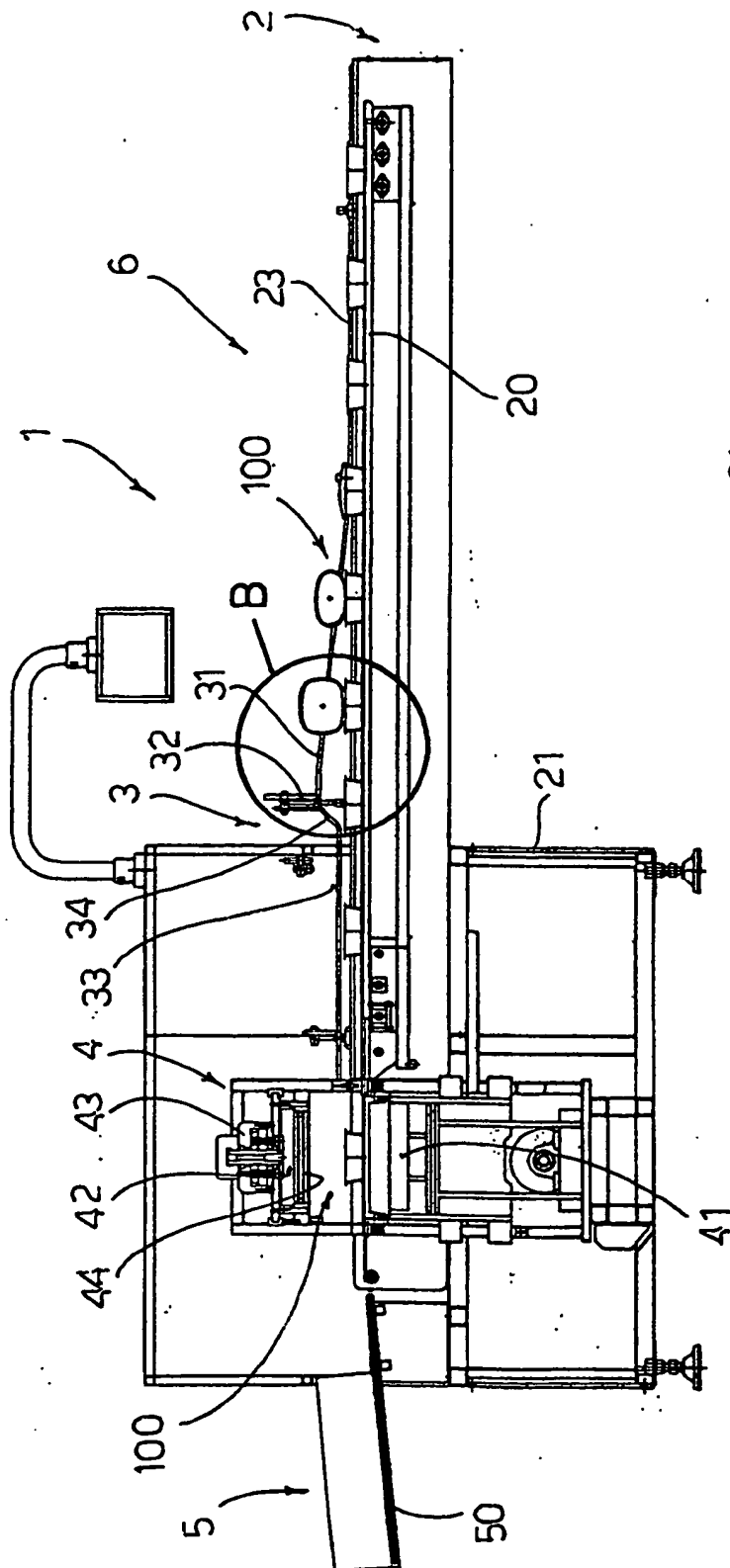


FIG. 2

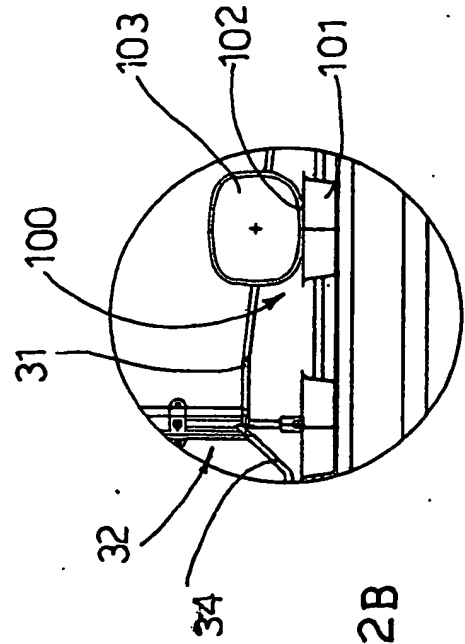


FIG. 2B

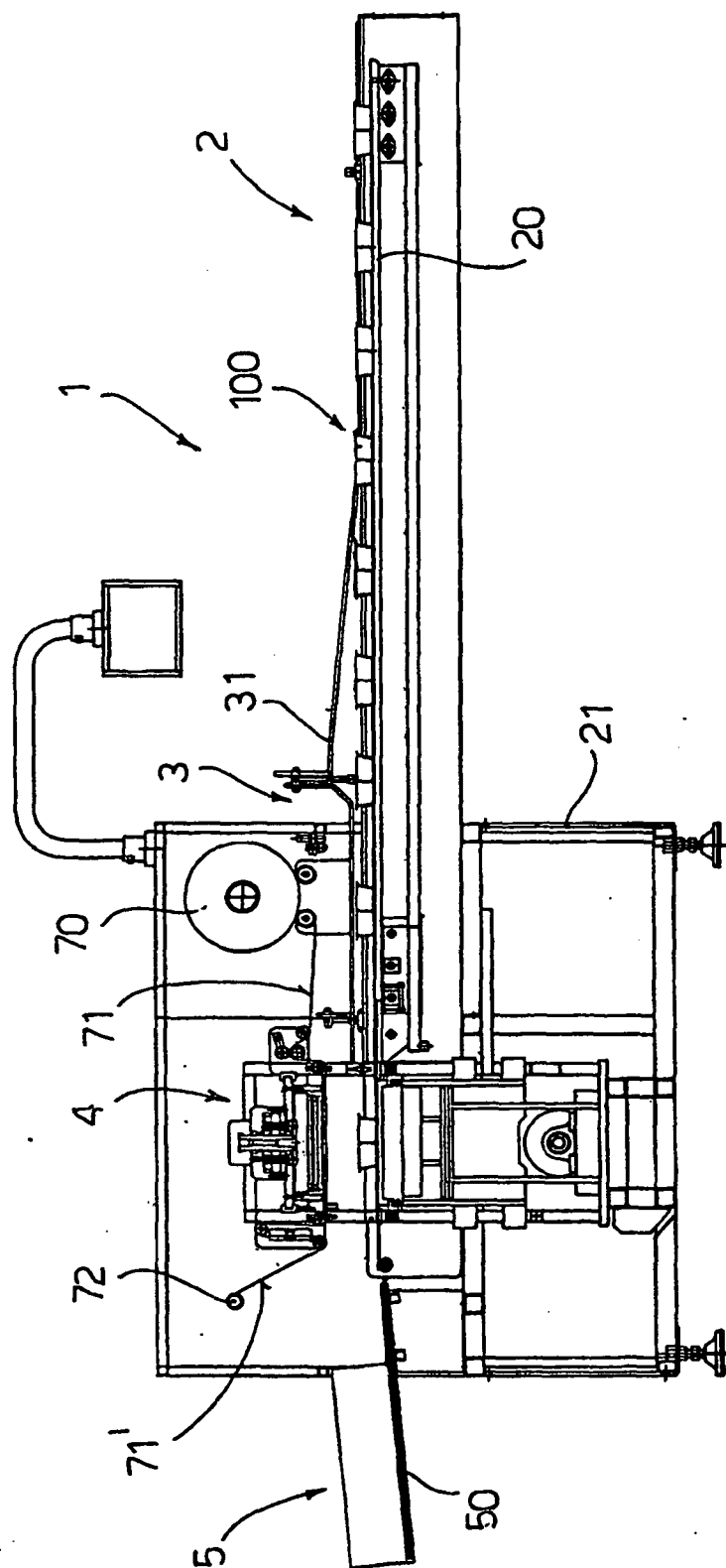


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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