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(54) **HEAT-SHRINKING FURNACE FOR THE FORMATION OF BUNDLES WITH IMPROVED FILM ADHESION**

WARMSCHRUMPFÖFEN ZUR HERSTELLUNG VON BÜNDELN MIT VERBESSERTER
FOLIENHAFTUNG

FOUR DE THERMO-RÉTRACTION POUR LA FORMATION DE PAQUETS AVEC ADHÉRENCE DE
FILM AMÉLIORÉE

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EP 3 126 256 B1

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Description

[0001] The present invention concerns a heat-shrinking furnace for forming bundles of products that are wrapped by films made in a heat-shrinkable material.

[0002] A further object of the present invention is a process for heat-shrinking films made in a heat-shrinkable material that is intended to form bundles of containers.

[0003] The object of the present invention is particularly used in the field of packaging products such as bottles, cans and/or similar containers in which wrapping films to be used are provided and realized in a heat-shrinkable material that is intended to form respective bundles (cf. e.g. EP0994030).

[0004] As it is known, the formation of bundles of containers by heat-shrinking is generally carried out with the aid of suitable furnaces defining at least one advancement channel for the bundles.

[0005] Tunnel furnaces are provided with an inlet opening for continuously introducing separate groups of containers wrapped by respective heat-shrinkable films and with an outlet opening for the continuous outlet of respective bundles of heat-shrunk containers.

[0006] During heat-shrinking the plastic film shrinks becoming compact against the products and therefore making the finished bundle compact.

[0007] However, the Applicant has found that during the step of heat-shrinking the film, the latter stops or slows down abruptly, in the moment in which it comes into contact with the wall of the products.

[0008] The reason why such a phenomenon occurs is that usually the products have a lower temperature and during the shrinking step the hot film, coming into contact with the container, undergoes cooling such as to stop or slow down the shrinking.

[0009] Such a phenomenon can be seen more clearly in the open side areas of the bundle in which the overlapping portions of the film could shrink much more than what usually actually occurs.

[0010] Starting from the aforementioned current state of the art, the main purpose of the present invention is to propose a furnace and a process for heat-shrinking bundles in which the film, for the same materials and sizes, can shrink more and thus make the finished bundle more stable.

[0011] A further purpose of the present invention is to reduce the overall consumption of energy necessary in order for the furnaces to operate in an optimal manner.

[0012] The purposes specified above, and yet others, are substantially achieved with a furnace and with a process for heat-shrinking films made in a heat-shrinkable material that is intended for realizing bundles of containers, in accordance with the present invention.

[0013] The description shall be made in the rest of the document with reference to the attached drawings, which are provided purely as an indication and therefore not for limiting purposes, in which two examples of a furnace according to the present invention are shown.

Figure 1 shows a top view of the furnace according to the present invention;

Figure 2 shows a side view of the furnace of figure 1.

[0014] Such a heat-shrinking furnace 10 is suitable for forming bundles 11 of products 12 that are wrapped by a heat-shrinkable film 13.

[0015] The furnace is of the type defining at least an advancement channel 14 for the bundles 11 along the advancement direction X and comprises:

- an inlet 15 which is fed by a bundle 11 of products 12 in succession one after the other, said products being tunnel-wrapped in a loose manner by heat-shrinkable film 13 so as to identify two lateral openings 17 that are orthogonal to the advancement direction X;
- an outlet 16 for the release of the bundles 11 of products 12 wrapped in a compact manner by the heat-shrinkable film 13;
- heating means operating between the inlet 15 and the outlet 16 for making the heat-shrinking of the film 13 on the products 12.

[0016] According to the invention, in an intermediate position between the inlet 15 and the outlet 16, the furnace comprises means to temporarily hold the heat-shrinkable film 13 spaced apart from the products 12 at the lateral openings 17 during heat-shrinking.

[0017] According to a preferred embodiment the means to temporarily hold the heat-shrinkable film 13 spaced apart from the products 12 at the lateral openings 17 during the heat-shrinking step comprise means for generating an air blow 19.

[0018] Such a blow 19 is at least partially directed along the advancement direction X in an intermediate position between the inlet 15 and the outlet 16 at both lateral walls 18 of each advancement channel 14, so that the blows 19 penetrate inside the lateral openings 17 of the heat-shrinkable film 13 that is wrapped in a loose manner on the containers 12.

[0019] In such a way the heat-shrinkable film 13 is held temporarily spaced apart from the products 12 at the lateral openings 17.

[0020] In one first version the means for generating an air blow 19 at least partially directed along the advancement direction X comprise, for each wall 18 of the channel 14, a blowing device 20 directed inclined towards the channel 14 so as to directly intercept the openings 18.

[0021] In a second version the means for generating an air blow 19 at least partially directed along the advancement direction X comprise, for each wall 18 of the channel 14, a blowing device 20 that is directed towards a deflecting element 21 arranged on the respective wall 18.

[0022] Such a deflector 21 is configured so as to reflect the blow 19 towards the openings 18.

[0023] Finally, a third version is provided in which the

deflectors act directly on the air *per se* fed to the furnace from the walls of the channels 18.

[0024] The method implemented by the furnace 10 described above comprises the steps of:

- feeding into a heat-shrinking furnace a bundle 11 of products 12 in succession one after the other, said products being tunnel-wrapped in a loose manner by the heat-shrinkable film 13 so as to identify two lateral openings 17 that are orthogonal to the advancement direction X;
- heating the film 13 during the advancement of the bundle 11 into the furnace 10 for making the heat-shrinking of the film 13 on the products 12;
- releasing the bundles 11 of products 12 wrapped in a compact manner by the heat-shrinkable film 13.

[0025] In particular, the method also comprises the step of:

- holding the heat-shrinkable film 13 temporarily spaced apart from the products 12 at the lateral openings 17 during heat-shrinking.

[0026] Such a last step is made by dispensing air blows directed in a manner such as to "enter" the lateral openings of the bundle thus holding the film spaced apart from the products at least in the first steps of the heat-shrinking.

[0027] Such air blows can be directly oriented inclined towards the openings or they can be reflected in such a direction by suitable deflectors.

[0028] The object of the present invention solves the drawbacks found in the prior art and achieves important advantages in which, in particular the film, for the same materials and sizes, can be shrunk to a greater extent and thus make the finished bundle more stable.

Claims

1. Heat-shrinking furnace (10) for forming bundles (11) of products (12) wrapped in a heat-shrinkable film (13); said furnace being of the type defining at least one channel (14) for the advancement of said bundles (11) along the advancement direction (X) and comprising:

- an inlet (15) which is fed by said bundles (11) of products (12) in succession one after the other, said products being tunnel-wrapped in a loose manner by said heat-shrinkable film (13) so as to identify two lateral openings (17) orthogonal to said advancement direction (X);
- an outlet (16) for the release of said bundles (11) of products (12) wrapped in a compact manner by said heat-shrinkable film (13);
- heating means operating between said inlet

(15) and said outlet (16) for making the heat-shrinking of the film (13) on said products (12);

in an intermediate position between said inlet (15) and said outlet (16) said furnace (10) comprises means for temporarily holding said heat-shrinkable film (13) spaced apart from said products (12) at said lateral openings (17) during heat-shrinking; said means for temporarily holding said heat-shrinkable film (13) spaced apart from said products (12) at said lateral openings (17) during heat-shrinking comprise means for generating an air blow (19) which is at least partially directed along said advancement direction (X), said means being arranged in an intermediate position between said inlet (15) and said outlet (16) at both lateral walls (18) of each advancement channel (14), so that said blows (19), by penetrating into said lateral openings (17) of said heat-shrinkable film (13) wrapped in a loose manner on said containers (12), hold said heat-shrinkable film (13) temporarily spaced apart from said products (12) at said lateral openings (17); **characterized in that** said means for generating an air blow (19), which is at least partially directed along said advancement direction (X), comprise, for each wall (18) of said channel (14), a blowing device (20) directed towards a deflecting element which is arranged on the respective wall (18), said deflector (21) being configured for reflecting said blow (19) towards said openings (18).

2. Furnace according to claim 1 **characterized in that** said walls (18) are fed by air along substantially their entire development and are provided with holes for the supply of said air into said channel (14) substantially in the direction orthogonal to said advancement direction (X), said means for temporarily holding said heat-shrinkable film (13) spaced apart from said products (12) at said lateral openings (17) during heat-shrinking comprise deflectors arranged in an intermediate position between said inlet (15) and said outlet (16) at both lateral walls (18) of each channel (14) to direct, where present, the air exiting from said walls at least partially along said advancement direction (X) so that the air, by penetrating into said lateral walls (17) of said heat-shrinkable film (13) wrapped in a loose manner on said containers (12), holds said heat-shrinkable film (13) temporarily spaced apart from said products (12) at said lateral openings (17).

3. Method for heat-shrinking for forming bundles (11) of products (12) wrapped by a heat-shrinkable film (13); said method comprising the steps of:

- feeding into a heat-shrinking furnace in succession one after the other a bundle (11) of products (12), which is tunnel-wrapped in a loose

manner by said heat-shrinkable film (13) so as to identify two lateral openings (17) orthogonal to said advancement direction (X) ;

- heating said film (13) during the advancement of said bundle (11) into said furnace (10) for making the heat-shrinking of said film (13) on said products (12);

- releasing said bundles (11) of products (12) wrapped in a compact manner by said heat-shrunk film (13);

- holding said heat-shrinkable film (13) temporarily spaced apart from said products (12) at said lateral openings (17) during heat-shrinking;

said step of holding said heat-shrinkable film (13) temporarily spaced apart from said products (12) at said lateral openings (17) during heat-shrinking is made through the step of generating an air blow (19) at least partially directed along said advancement direction (X) so that said blows penetrate into said lateral walls (17) of said heat-shrinkable film (13) wrapped in a loose manner on said containers (12); **characterized in that** the step of generating an air blow (19) which is at least partially directed along said advancement direction (X) so that said blows (19) penetrate into said lateral walls (17) of said heat-shrinkable film (13) wrapped in a loose manner on said containers (12) is made through the step of supplying an air blow directed towards a deflector element arranged on the respective wall (18), said deflector (21) being configured to reflect said blow (19) towards said openings (18).

4. Method according to claim 3 **characterized in that** the step of holding said heat-shrinkable film (13) temporarily spaced apart from said products (12) at said lateral openings (17) during heat-shrinking is made through the reflection of an air flow exiting from said walls (18).

Patentansprüche

1. Warmschrumpfofen (10) zur Herstellung von Bündeln (11) von Produkten (12), die in einer warmschrumpfbaren Folie (13) umwickelt werden; wobei der Ofen von dem Typ ist, der mindestens einen Kanal (14) für den Vorschub der Bündel (11) entlang der Vorschubrichtung (X) definiert, und umfasst:

- einen Einlass (15), der nacheinander mit den Bündeln (11) von Produkten (12) beschickt wird, wobei die Produkte auf eine lose Weise in einem Tunnel von der warmschrumpfbaren Folie (13) umwickelt werden, um zwei seitliche Öffnungen (17) orthogonal zu der Vorschubrichtung (X) zu identifizieren;

- einen Auslass (16) für das Freigeben der Bündel (11) von Produkten (12), die auf eine kompakte Weise mit der warmschrumpfbaren Folie (13) umwickelt sind;

- Heizmittel, die zwischen dem Einlass (15) und dem Auslass (16) wirken, um das Warmschrumpfen der Folie (13) auf den Produkten (12) vorzunehmen;

wobei der Ofen (10) in einer Zwischenposition zwischen dem Einlass (15) und dem Auslass (16) Mittel zum zeitweiligen Halten der warmschrumpfbaren Folie (13) von den Produkten (12) beabstandet an den seitlichen Öffnungen (17) während des Warmschrumpfens umfasst; wobei die Mittel zum zeitweiligen Halten der warmschrumpfbaren Folie (13) beabstandet von den Produkten (12) an den seitlichen Öffnungen (17) während des Warmschrumpfens Mittel zum Erzeugen eines Luftblasens (19) umfassen, das zumindest teilweise entlang der Vorschubrichtung (X) gerichtet ist, wobei die Mittel in einer Zwischenposition zwischen dem Einlass (15) und dem Auslass (16) an beiden seitlichen Wänden (18) von jedem Vorschubkanal (14) angeordnet sind, derart dass die Blasströmungen (19) durch Eindringen in die seitlichen Öffnungen (17) der warmschrumpfbaren Folie (13), mit der die Behälter (12) auf eine lose Weise umwickelt sind, die warmschrumpfbare Folie (13) zeitweilig von den Produkten (12) an den seitlichen Öffnungen (17) beabstandet halten; **dadurch gekennzeichnet, dass** die Mittel zum Erzeugen eines Luftblasens (19), das zumindest teilweise entlang der Vorschubrichtung (X) ausgerichtet ist, für jede Wand (18) des Kanals (14) eine Blasvorrichtung (20) umfassen, die hin zu einem Umlenkelement gerichtet ist, das an der entsprechenden Wand (18) angeordnet ist, wobei die Umlenkeinrichtung (21) zum Reflektieren des Blasens (19) hin zu den Öffnungen (18) ausgebildet ist.

2. Ofen nach Anspruch 1, **dadurch gekennzeichnet, dass** die Wände (18) im Wesentlichen entlang ihrer gesamten Entwicklung mit Luft beschickt werden und mit Löchern für die Zufuhr der Luft in den Kanal (14) im Wesentlichen in der Richtung orthogonal zu der Vorschubrichtung (X) versehen sind, wobei die Mittel zum zeitweiligen Halten der warmschrumpfbaren Folie (13) beabstandet von den Produkten (12) an den seitlichen Öffnungen (17) während des Warmschrumpfens Umlenkeinrichtungen umfassen, die in einer Zwischenposition zwischen dem Einlass (15) und dem Auslass (16) an beiden seitlichen Wänden (18) von jedem Kanal (14) angeordnet sind, um, wo vorhanden, die Luft, die von den Wänden austritt, derart zumindest teilweise entlang der Vorschubrichtung (X) zu richten, dass die Luft durch Eindringen in die seitlichen Wände (17) der warmschrumpfbaren Folie (13), mit der die Behälter (12) auf eine lose Weise umwickelt sind, die warm-

schrumpfbare Folie (13) zeitweilig von den Produkten (12) an den seitlichen Öffnungen (17) beabstandet hält.

3. Verfahren zum Warmschrumpfen zur Herstellung von Bündeln (11) von Produkten (12), die von einer warmschrumpfbaren Folie (13) umwickelt sind; wobei das Verfahren die folgenden Schritte umfasst:

- Beschicken eines Warmschrumpfofens nacheinander mit einem Bündel (11) von Produkten (12), das auf eine lose Weise in einem Tunnel von der warmschrumpfbaren Folie (13) umwickelt wird, um zwei seitliche Öffnungen (17) orthogonal zu der Vorschubrichtung (X) zu identifizieren;
- Erhitzen der Folie (13) während des Vorschubs des Bündels (11) in den Ofen (10), um das Warmschrumpfen der Folie (13) auf den Produkten (12) vorzunehmen;
- Freigeben der Bündel (11) von Produkten (12), die auf eine kompakte Weise von der warmschrumpften Folie (13) umwickelt wurden;
- zeitweiliges Halten der warmschrumpfbaren Folie (13) von den Produkten (12) beabstandet an den seitlichen Öffnungen (17) während des Warmschrumpfens;

wobei der Schritt zum zeitweiligen Halten der warmschrumpfbaren Folie (13) beabstandet von den Produkten (12) an den seitlichen Öffnungen (17) während des Warmschrumpfens durch den Schritt zum Erzeugen eines Luftblasens (19) vorgenommen wird, das derart zumindest teilweise entlang der Vorschubrichtung (X) gerichtet ist, dass die Blasströmungen in die seitlichen Wände (17) der warmschrumpfbaren Folie (13) eindringen, mit der die Behälter (12) auf eine lose Weise umwickelt sind;

dadurch gekennzeichnet, dass der Schritt zum Erzeugen eines Luftblasens (19), das derart zumindest teilweise entlang der Vorschubrichtung (X) gerichtet ist, dass die Blasströmungen (19) in die seitlichen Wände (17) der warmschrumpfbaren Folie (13) eindringen, mit der die Behälter (12) auf eine lose Weise umwickelt sind, durch den Schritt zum Zuführen eines Luftblasens vorgenommen wird, das hin zu einem Umlenkelement gerichtet ist, das an der entsprechenden Wand (18) angeordnet ist, wobei die Umlenkeinrichtung (21) ausgebildet ist, um das Blasen (19) hin zu den Öffnungen (18) zu reflektieren.

4. Verfahren nach Anspruch 3, **dadurch gekennzeichnet, dass** der Schritt zum zeitweiligen Halten der warmschrumpfbaren Folie (13) beabstandet von den Produkten (12) an den seitlichen Öffnungen (17) während des Warmschrumpfens durch die Reflexion einer Luftströmung vorgenommen wird, die von den Wänden (18) austritt.

Revendications

1. Four de thermo-rétraction (10) pour former des paquets (11) de produits (12) enveloppés dans un film thermo-rétractable (13); ledit four étant du type définissant au moins un canal (14) pour l'avance desdits paquets (11) suivant la direction d'avance (X) et comprenant :

- une entrée (15) qui est alimentée par lesdits paquets (11) de produits (12) en succession l'un après l'autre, lesdits produits étant enveloppés en tunnel d'une manière lâche par ledit film thermo-rétractable (13) de manière à identifier deux ouvertures latérales (17) orthogonales à ladite direction d'avance (X) ;
- une sortie (16) pour la libération desdits paquets (11) de produits (12) enveloppés d'une manière compacte par ledit film thermo-rétractable (13);
- des moyens de chauffage fonctionnant entre ladite entrée (15) et ladite sortie (16) pour réaliser la thermo-rétraction du film (13) sur lesdits produits (12) ;

dans une position intermédiaire entre ladite entrée (15) et ladite sortie (16), ledit four (10) comprend des moyens pour maintenir temporairement ledit film thermo-rétractable (13) espacé desdits produits (12) au niveau desdites ouvertures latérales (17) durant la thermo-rétraction ; lesdits moyens pour maintenir temporairement ledit film thermo-rétractable (13) espacés desdits produits (12) au niveau desdites ouvertures latérales (17) durant la thermo-rétraction comprennent des moyens pour générer un souffle d'air (19) qui est dirigé au moins partiellement suivant ladite direction d'avance (X), lesdits moyens étant agencés dans une position intermédiaire entre ladite entrée (15) et ladite sortie (16) au niveau de deux parois latérales (18) de chaque canal d'avance (14), de manière que lesdits souffles (19), en pénétrant dans lesdites ouvertures latérales (17) dudit film thermo-rétractable (13) enveloppés d'une manière lâche sur lesdits récipients (12), maintiennent ledit film thermo-rétractable (13) espacé temporairement desdits produits (12) au niveau desdites ouvertures latérales (17) ; **caractérisé en ce que** lesdits moyens pour générer un souffle d'air (19), qui est dirigé au moins partiellement suivant ladite direction d'avance (X), comprennent, pour chaque paroi (18) dudit canal (14), un dispositif soufflant (20) dirigé vers un élément déviateur qui est agencé sur la paroi respective (18), ledit déflecteur (21) étant configuré pour renvoyer ledit souffle (19) vers lesdites ouvertures (18).

2. Four selon la revendication 1, **caractérisé en ce que** lesdites parois (18) sont alimentées par de l'air sen-

siblement le long de tout leur développement et sont pourvues de trous pour l'alimentation dudit air dans ledit canal (14) sensiblement dans la direction orthogonale à ladite direction d'avance (X), lesdits moyens pour maintenir temporairement ledit film thermo-rétractable (13) espacé desdits produits (12) au niveau desdites ouvertures latérales (17) durant la thermo-rétraction comprennent des déflecteurs agencés dans une position intermédiaire entre ladite entrée (15) et ladite sortie (16) au niveau des deux parois latérales (18) de chaque canal (14) pour diriger, là où il est présent, l'air sortant desdits parois au moins partiellement suivant ladite direction d'avance (X) de manière que l'air, en pénétrant dans lesdites parois latérales (17) dudit film thermo-rétractable (13) enveloppé d'une manière lâche sur lesdits récipients (12), maintienne ledit film thermo-rétractable (13) temporairement espacé desdits produits (12) au niveau desdites ouvertures latérales (17).

3. Procédé de thermo-rétraction pour former des paquets (11) de produits (12) enveloppés par un film thermo-rétractable (13) ; ledit procédé comprenant les étapes suivantes :

- l'alimentation dans un four de thermo-rétraction en succession l'un après l'autre un paquet (11) de produits (12), qui est enveloppés en tunnel d'une manière lâche par ledit film thermo-rétractable (13) de manière à identifier deux ouvertures latérales (17) orthogonale à ladite direction d'avance (X) ;
- le chauffage dudit film (13) durant l'avance dudit paquet (11) dans ledit four (10) pour réaliser la thermo-rétraction dudit film (13) sur lesdits produits (12) ;
- la libération desdits paquets (11) de produits (12) enveloppés d'une manière compacte par ledit film thermo-rétractable (13) ;
- le maintien dudit film thermo-rétractable (13) temporairement espacé desdits produits (12) auxdites ouvertures latérales (17) durant la thermo-rétraction ;

ladite étape de maintien dudit film thermo-rétractable (13) temporairement espacé desdits produits (12) au niveau desdites ouvertures latérales (17) durant la thermo-rétraction est réalisée par le biais de l'étape de génération d'un souffle d'air (19) dirigé au moins partiellement suivant ladite direction d'avance (X) de manière que les souffles pénètrent dans lesdites parois latérales (17) dudit film thermo-rétractable (13) enveloppé d'une manière lâche sur lesdits récipients (12) ;

caractérisé en ce que l'étape de génération d'un souffle d'air (19) qui est dirigé au moins partiellement suivant ladite direction d'avance (X) de manière que

lesdits souffles (19) pénètrent dans lesdites parois latérales (17) dudit film thermo-rétractable (13) enveloppé d'une manière lâche sur lesdits récipients (12) est réalisée par le biais de l'étape d'alimentation d'un souffle d'air dirigé vers un élément déviateur agencé sur la paroi respective (18), ledit déflecteur (21) étant configuré pour renvoyer ledit souffle (19) vers lesdites ouvertures (18).

4. Procédé selon la revendication 3, **caractérisé en ce que** l'étape de maintien dudit film thermo-rétractable (13) temporairement espacé desdits produits (12) au niveau desdites ouvertures latérales (17) durant la thermo-rétraction est réalisée par le biais de la réflexion d'un souffle d'air sortant desdites parois (18).

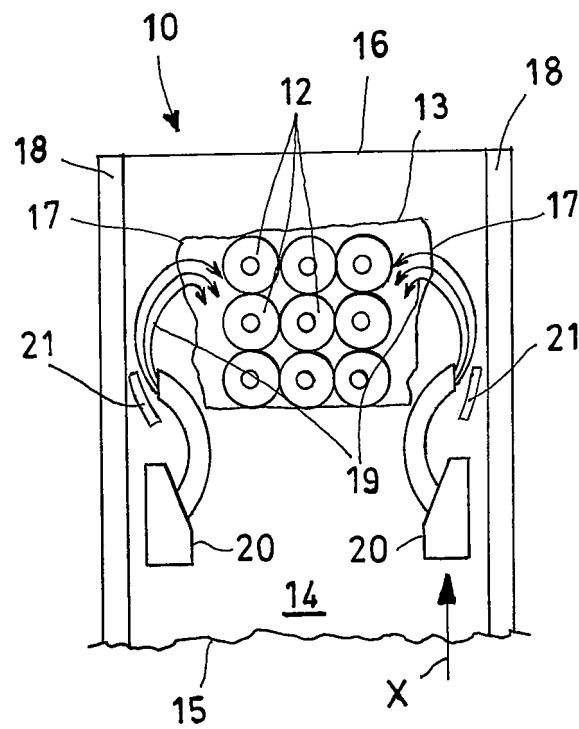
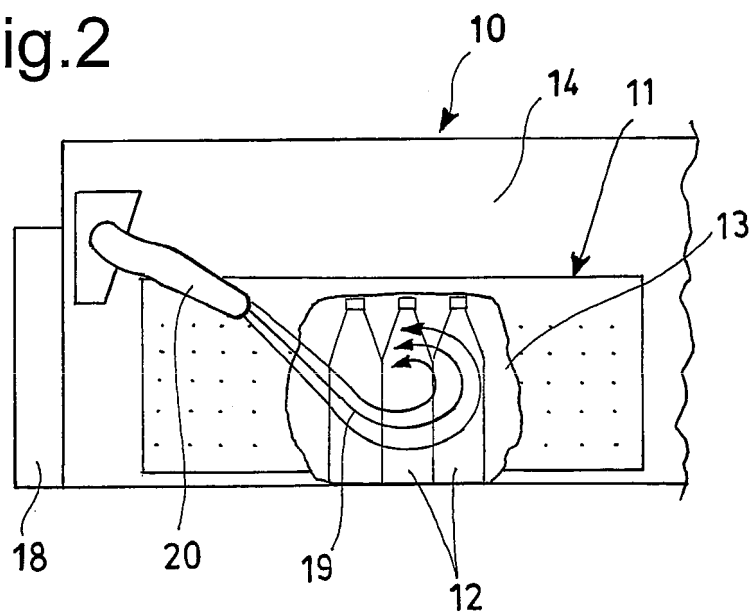


Fig.1

Fig.2



REFERENCES CITED IN THE DESCRIPTION

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