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(54) Method and device for extracting intermediate flat supports for stacks of products

Verfahren und Vorrichtung zum Herausziehen von dazwischenliegenden flachen Trägern für
Produktstapel

Procédé et dispositif pour extraire des supports plats intermédiaires pour des piles de produits

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(56) References cited:
EP-A- 0 437 760 **EP-A- 0 486 719**
WO-A-90/04558

- **PATENT ABSTRACTS OF JAPAN vol. 11, no. 25 (M-556) [2472] , 23 January 1987 & JP 61 197334 A (MATSUSHITA ELECTRIC), 1 September 1986,**
- **PATENT ABSTRACTS OF JAPAN vol. 9, no. 84 (M-371) [1807] , 13 April 1985 & JP 59 212335 A (FUJI SHASHIN FILM), 1 December 1984,**
- **PATENT ABSTRACTS OF JAPAN vol. 17, no. 324 (M-1433), 21 June 1993 & JP 05 038693 A (FANUC), 19 February 1993,**

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Description

[0001] The present invention relates to a method and a device for extracting intermediate flat supports for stacks of products in accordance with the preamble of claims 1 and 5.

[0002] In particular, the invention relates to a method for extracting intermediate flat supports for stacks of cardboard cutouts arranged on pallets and the like.

[0003] Devices are currently known which allow to pick up stacks of cutouts, such as for example those used to package cigarette packets of the rigid flip-top type. These stacks of cutouts are generally arranged on a pallet-like support in multiple rows and in a plurality of layers that are separated from one another, in pairs, by an intermediate flat support constituted for example by a sheet of paper of appropriate thickness.

[0004] These devices pick up the stacks of cutouts in an orderly fashion and then transfer them to an inlet of a user machine.

[0005] Once the transfer of an entire layer of stacks of cutouts has been completed, the intermediate flat support is extracted.

[0006] For this purpose, there are provided appropriate devices which have means for gripping said intermediate flat support and are constituted for example by sucker-fitted suction means.

[0007] Said grip means are capable of moving between a position for picking up the intermediate flat supports and a position for releasing said intermediate flat supports inside a collecting container.

[0008] In known extraction devices, in many cases the cutouts arranged at the top of the stacks of the layer that lies below the flat support to be extracted cling to said flat support when it is picked up by said sucker-fitted suction means.

[0009] Due to the porosity of the material that constitutes the flat support, the suction of the suckers also affects the cutouts that are arranged at the regions where said suckers are applied.

[0010] Furthermore, more generally, the lifting of the flat support tends to produce, with known extraction devices, movement of the cutouts located at the top of the stacks with respect to the lower ones, due to adhesion between said flat support and said cutouts.

[0011] Examples of solutions to the problems raised by the extraction and disposal of the intermediate flat supports arranged between superimposed stacks of products are available from the prior documents JP-A-61.197334 (Patent Abstracts of Japan Vol 11, no 25, 23 Jan. 1987), which corresponds to the preamble of claims 1 and 5, WO-A-90 04558, EP-A-0 486 719 and EP-A-0 437 760.

[0012] The aim of the present invention is to provide an extraction method and a device that allow to eliminate the above described drawback, extracting the intermediate flat supports without interfering with the stacks of products.

[0013] According to the present invention, a method and a device are provided for extracting intermediate flat supports of stacks of products, as defined by the combinations of steps and features of claims 1 and 5.

[0014] Preferably, the step of moving said element above said flat support to be extracted is performed by moving said suction means into contact with said flat support.

[0015] The invention is now described with reference to the accompanying drawing, which illustrates a non-limitative example of embodiment thereof, in which the only figure is a schematic side view of an extraction device that performs the method according to the present invention.

[0016] With reference to the above figure, the reference numeral 1 designates a device for extracting intermediate flat supports 2 for stacks 3 of cutouts, such as for example those used to package cigarette packets of the rigid type.

[0017] The stacks 3 of cutouts are arranged in an orderly fashion on pallet-like supporting means 4. In particular, the stacks 3 of cutouts are arranged so as to form superimposed layers 5 that are mutually separated by virtue of the intermediate flat supports 2, which are made of flexible material, for example paper.

[0018] The extraction device 1 includes a vertical framework 6 that is provided with a container 7 for collecting the extracted flat supports 2. Said framework 6 is provided, in a substantially median position, with a bracket 8, and an arm 10 that oscillates on a vertical plane is pivoted to said bracket 8 by virtue of a pivot 9 that has a horizontal axis. The arm 10 is suitable to be actuated, by means of a crank 11, by a jack 12 that is pivoted to said framework 6.

[0019] A grip element 14 is articulated to the free end of the oscillating arm 10 by means of a pivot 13 having a horizontal axis. Said grip element 14 comprises a frame 15 provided with suction means 16 that are constituted for example by a plurality of suckers 16 adapted to be connected to appropriate known suction devices, which are not shown in the figure. The grip element 14 is furthermore provided, on the same side as the suckers 16, with a plurality of presser elements 17 that are actuable by respective actuators 18 along axes that are perpendicular to the frame 15.

[0020] The suckers 16 are arranged at opposite ends of the frame 15, so as to act at the peripheral region of the flat support 2 to be extracted, while the pressers 17 are arranged in a central region of said frame 15.

[0021] The method for extracting the intermediate flat supports 2 entails a first step during which, by rotating the oscillating arm 10, actuated by the jack 12, the frame 15 is placed above the flat support 2 to be extracted so that the suckers 16 are arranged in contact with said flat support 2.

[0022] It should be pointed out that for the sake of clarity said first step is shown in the accompanying figure with the frame 15 arranged (dashed line) above a flat

support 2 that separates two lower layers 5 of stacks 3.

[0023] Thereafter the presser elements 17 are actuated by the actuators 18. Said pressers 17 act on the stacks 3 that lie below the flat support 2 to be extracted, by virtue of the interposition of said flat support 2, in order to apply a constant pressure that is directed towards the pallet 4 and is capable of blocking said stacks 3.

[0024] Then, first the suction means connected to the suckers 16 are activated and thereafter an upward rotation of the arm 10 is actuated the extent whereof is such as to cause a slight lifting of the frame 15 and accordingly a slight curving of the flat support 2, the peripheral region whereof is raised with respect to the cutouts that constitute the top of the stack 3. This step of the operation of the device 1 is shown (in solid lines) in the upper part of the figure, with reference to the removal of the upper flat support 2.

[0025] The subsequent deactivation of the actuators 18 that actuate the pressers 17 allows the flat support 2 to fully separate from the stacks 3 and to continue to be retained against the frame 15 by means of the suckers 16, preventing relative movements of the cutouts that lie below said flat support 2.

[0026] Finally, the rotation of the oscillating arm 10 is completed, and said arm is arranged in a vertical position (dot-and-dash line), while known actuators, not shown, are actuated to turn the frame 15 about the pivot 13 and move said frame 15 into a vertical position (dot-and-dash line) at the container 7, inside which the extracted flat support 2 is allowed to drop as a consequence of the deactivation of said suction means.

[0027] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A method for extracting intermediate flat supports (2) of stacks (3) of products, comprising the steps of: moving a grip element (14) horizontally above a flat support (2) to be extracted; activating presser means (17), carried by said grip element (14), to act on the stacks (3) that lie below said flat support (2), with said flat support (2) being interposed; lifting said flat support (2), at its peripheral region, by way of suction means (16) carried by said grip element (14), and deactivating said presser means (17); **characterized in that it further comprises the steps of** moving said grip element (14) with the flat support (2) retained thereon by said suction means through rotation of an arm (10) to which said grip element (14) is pivoted up to a vertical position; rotating said grip element (14) to locate itself in a

vertical position; and deactivating said suction means (16) to allow said flat support (2) to drop edgewise into an underlying vertically extending, top open collection container (7).

2. Method according to claim 1, characterized in that said step of moving said grip element (14) above said flat support (2) to be extracted is performed by moving said suction means (16) into contact with said flat support (2).
3. Method according to claim 1, characterized in that the step of rotating said arm is performed by way of a crank (11) actuated by a jack (12) pivoted to a vertical framework (6) at which said vertical container (7) is provided and to which said arm (10) is also pivoted.
4. Method according to claim 3, characterized in that said arm (10) is rotatable through various extents between a plurality of positions for extraction of flat supports provided at various levels between superimposed stacks (3) and the vertical position for dropping the extracted flat supports in said collection container (7).
5. A device for extracting intermediate flat supports (2) from over stacks (3) of products, comprising a grip element (14) for gripping a flat support (2) which is provided with presser means (17) actuatable to press down the stacks (3) that lie below the flat support (2), by acting on top of said flat support (2), and with suction means (16) adapted to act at the peripheral region of said flat support (2) for the lift and respectively upon deactivation of the presser means for the extraction thereof, **characterized in that** it further comprises a vertical framework (6) supporting a vertically extending container (7) being opened at the top part thereof for receiving the flat supports (2) removed from the stacks (3), an oscillating arm pivoted to said framework (6) and supporting at the free end thereof, rotatably pivoted, the grip element (14), said arm being actuatable to rotate between an inclined position in which the grip element (14) is located horizontally above a flat support (2) to be extracted from over the stacks (3), and a vertical position in which the grip element (14) is rotated in a vertical position for allowing the extracted flat support (2) to drop edgewise inside said container (7).
6. Device according to claim 5, characterized in that it further comprises a jack (12) pivoted to said framework which is operatively connected to a crank (11) for actuating said arm (10) in rotation.
7. Device according to any of the claims 5 or 6, characterized in that it comprises actuators (18) pro-

vided at said grip element (14) for actuating said presser means (17).

8. Device according to any one of the claims 5-7, characterized in that said grip element (14) is provided with rotation actuation means, for rotation thereof between said horizontal and vertical positions, and with actuators (18) for actuating said presser means, said rotation actuation means, said suction means (16) and said actuators (18) being activatable independently one from the other.

Patentansprüche

1. Verfahren zum Herausziehen von dazwischenliegenden flachen Trägern (2) aus Stapeln (3) von Produkten umfassend die Schritte: Bewegen eines Greifelementes (14) horizontal über einen herauszuziehenden flachen Träger (2), Aktivieren von Druckvorrichtungen (17), die von diesem Greifelement (14) getragen werden, um auf die Stapel (3) einzuwirken, die unter dem flachen Träger (2) liegen, wobei sich der flache Träger (2) in Zwischenlage befindet, Hochheben des flachen Trägers (2) an seinem Randbereich mittels Saugvorrichtungen (16), die von diesem Greifelement (14) getragen werden, und Deaktivieren der Druckvorrichtungen (17), dadurch **gekennzeichnet**, daß es ferner die Schritte umfaßt: Bewegen des Greifelementes (14), an dem der flache Träger (2) mittels der Saugvorrichtungen gehalten wird, durch Drehen eines Arms (10), an dem das Greifelement (14) schwenkbar gelagert ist, bis in eine vertikale Stellung, Drehen des Greifelementes (14), um es in einer vertikalen Stellung anzuordnen, und Deaktivieren der Saugvorrichtungen (16), um dem flachen Träger (2) zu ermöglichen, daß er hochkant in einen darunterliegenden, sich vertikal erstreckenden und nach oben offenen Sammelbehälter (7) fällt.
2. Verfahren nach Anspruch 1, dadurch **gekennzeichnet**, daß der Schritt des Bewegens des Greifelementes (14) über den herauszuziehenden flachen Träger (2) durch Bewegen der Saugvorrichtungen (16) in Kontakt mit dem flachen Träger (2) ausgeführt wird.
3. Verfahren nach Anspruch 1, dadurch **gekennzeichnet**, daß der Schritt des Drehens des Arms mittels eines Kurbelarms (11) ausgeführt wird, der von einer Hebevorrichtung (12) betätigt wird, die an einem vertikalen Gestellrahmen (6) schwenkbar gelagert ist, an dem der vertikale Behälter (7) vorgesehen ist und an dem auch der Arm (10) schwenkbar gelagert ist.
4. Verfahren nach Anspruch 3, dadurch **gekennzeichnet**, daß der Arm (10) durch verschiedene

Bereiche zwischen einer Vielzahl von Stellungen zum Herausziehen flacher Träger, die auf unterschiedlichen Niveaus zwischen übereinandergelegten Stapeln (3) vorgesehen sind, und der vertikalen Stellung zum Fallenlassen der herausgezogenen flachen Träger in den Sammelbehälter (7) geschwenkt werden kann.

5. Vorrichtung zum Herausziehen von dazwischenliegenden flachen Trägern (2) aus Produktstapeln (3), umfassend ein Greifelement (14) zum Ergreifen eines flachen Trägers (2), das mit Druckvorrichtungen (17) versehen ist, die betätigbar sind, um die Stapel (3) nach unten zu drücken, die unter dem flachen Träger (2) liegen, indem sie auf die Oberseite des flachen Trägers (2) einwirken, und mit Saugvorrichtungen (16), die dazu geeignet sind, auf den Randbereich des flachen Trägers (2) einzuwirken, um diesen hochzuheben und entsprechend bei Deaktivieren der Druckvorrichtungen den Träger herauszuziehen, dadurch **gekennzeichnet**, daß sie ferner umfaßt: einen vertikalen Gestellrahmen (6), der einen sich vertikal erstreckenden Behälter (7) trägt, der nach oben hin offen ist, um die aus den Stapeln (3) entfernten flachen Träger (2) aufzunehmen, einen Schwingarm, der schwenkbar an dem Gestellrahmen (6) gelagert ist und an seinem freien Ende drehbar gelagert das Greifelement (14) trägt, wobei der Arm betätigbar ist, um sich zwischen einer geneigten Stellung, in der das Greifelement (14) horizontal über einem von oben aus den Stapeln (3) herauszuziehenden flachen Träger (2) angeordnet ist, und einer vertikalen Stellung zu drehen, in der das Greifelement (14) in eine vertikale Stellung gedreht wird, damit der herausgezogene flache Träger (2) hochkant in den Behälter (7) fallen kann.
6. Vorrichtung nach Anspruch 5, dadurch **gekennzeichnet**, daß sie ferner eine an dem Gestellrahmen schwenkbar gelagerte Hebevorrichtung (12) umfaßt, die betriebsmäßig mit einem Kurbelarm (11) verbunden ist, um den Arm (10) in Drehung zu versetzen.
7. Vorrichtung nach einem der Ansprüche 5 oder 6, dadurch **gekennzeichnet**, daß sie Betätigungsorgane (18) umfaßt, die an dem Greifelement (14) zum Betätigen der Druckvorrichtungen (17) vorgesehen sind.
8. Vorrichtung nach einem der Ansprüche 5 bis 7, dadurch **gekennzeichnet**, daß das Greifelement (14) mit Betätigungsmitteln zu seiner Drehung zwischen einer horizontalen und einer vertikalen Stellung versehen ist, und mit Betätigungsorganen (18) zum Betätigen der Druckvorrichtungen, wobei die Betätigungsmittel zum Drehen, die Saugvorrichtungen

gen (16) und die Betätigungsorgane (18) unabhängig voneinander aktiviert werden können.

Revendications

1. Procédé pour extraire des supports plats intermédiaires (2) de piles (3) de produits, comportant les étapes consistant à : déplacer un élément de saisie (14) horizontalement au-dessus d'un support plat (2) à extraire, activer des moyens presseurs (17) supportés par ledit élément de saisie (14), pour agir sur les piles (3) qui se trouvent en-dessous dudit support plat (2), ledit support plat (2) étant interposé, soulever ledit support plat (2) dans sa zone périphérique, par l'intermédiaire de moyens d'aspiration (16) supportés par ledit élément de saisie (14), et désactiver lesdits moyens presseurs (17), caractérisé en ce qu'il comporte de plus les étapes consistant à déplacer ledit élément de saisie (14), ayant le support plat (2) retenu sur celui-ci par lesdits moyens d'aspiration, par l'intermédiaire d'une rotation d'un bras (10), sur lequel ledit élément de saisie (14) est monté pivotant, vers une position verticale, mettre en rotation ledit élément de saisie (14) pour le positionner dans une position verticale, et désactiver lesdits moyens d'aspiration (16) pour permettre audit support plat (2) de tomber par le chant dans un récipient de collecte (7) à dessus ouvert, sous-jacent, disposé verticalement.

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 2. Procédé selon la revendication 1, caractérisé en ce que ladite étape consistant à déplacer ledit élément de saisie (14) au-dessus dudit support plat (2) à extraire est réalisée en déplaçant lesdits moyens d'aspiration (16) jusqu'au contact avec ledit support plat (2).

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 3. Procédé selon la revendication 1, caractérisé en ce que l'étape de mise en rotation dudit bras est réalisée par l'intermédiaire d'une manivelle (11) actionnée par un vérin (12) pivotant sur un châssis vertical (6) sur lequel ledit récipient vertical (7) est disposé et sur lequel ledit bras (10) pivote aussi.

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 4. Procédé selon la revendication 3, caractérisé en ce que ledit bras (10) peut tourner à des degrés différents entre une pluralité de positions d'extraction de supports plats agencés à des niveaux divers entre des piles superposées (3), et la position verticale destinée à laisser tomber les supports plats (2) extraits dans ledit récipient de collecte (7).

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 5. Dispositif pour extraire des supports plats intermédiaires (2) à partir de piles (3) de produits, comportant un élément de saisie (14) pour saisir un support plat (2) qui est muni de moyens presseurs (17) pouvant être actionnés pour appuyer vers le bas sur les piles (3) qui se trouvent en-dessous du

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- support plat (2), en agissant sur la partie supérieure dudit support plat (2), et muni de moyens d'aspiration (16) adaptés pour agir au niveau de la zone périphérique dudit support plat (2) pour le levage et, de manière respective, lors de la désactivation des moyens presseurs, pour l'extraction de celui-ci, caractérisé en ce qu'il comporte de plus un châssis vertical (6) supportant un récipient disposé verticalement (7) ouvert à sa partie supérieure pour recevoir les supports plats (2) enlevés des piles (3), un bras oscillant pivotant sur ledit châssis (6) et supportant à son extrémité libre, pivotant de manière rotative, l'élément de saisie (14), ledit bras pouvant être actionné pour tourner entre une position inclinée dans laquelle l'élément de saisie (14) est positionné horizontalement au-dessus d'un support plat (2) à extraire des piles (3), et une position verticale dans laquelle l'élément de saisie (14) est mis en rotation dans une position verticale pour permettre au support plat extrait (2) de tomber par le chant à l'intérieur dudit récipient (7).
6. Dispositif selon la revendication 5, caractérisé en ce qu'il comporte de plus un vérin (12) pivotant sur ledit châssis, qui est relié de manière opérationnelle à une manivelle, (11) destinée à actionner ledit bras (10).
 7. Dispositif selon l'une quelconque des revendications 5 ou 6, caractérisé en ce qu'il comporte des actionneurs (18) agencés au niveau dudit élément de saisie (14) pour actionner lesdits moyens presseurs (17).
 8. Dispositif selon l'une quelconque des revendications 5 à 7, caractérisé en ce que ledit élément de saisie (14) est muni de moyens d'actionnement en rotation, pour la mise en rotation de celui-ci entre lesdites positions horizontale et verticale, et d'actionneurs (18) destinés à actionner lesdits moyens presseurs, lesdits moyens d'actionnement en rotation, lesdits moyens d'aspiration (16) et lesdits actionneurs (18) pouvant être actionnés de manière indépendante les uns des autres.

