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(54) METHOD OF AND APPARATUS FOR AUTOMATIC SORTING OF SHEETFORMED OBJECTS

VERFAHREN UND VORRICHTUNG ZUR AUTOMATISCHEN SORTIERUNG VON
BLATTFÖRMIGEN GEGENSTÄNDEN

PROCEDE ET APPAREIL POUR TRIER AUTOMATIQUEMENT DES OBJETS EN FORME DE
FEUILLES

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EP 0 624 144 B1

Description

The present invention relates to a method of automatically sorting sheet-like objects into bundled groups, in which the objects are advanced in rows. The invention is intended for application when sorting, among other things, computer printouts, both in a folded and non-folded state, envelopes, so-called mailers, etc.

The invention also relates to arrangement for carrying out the method.

Methods and arrangement of this general kind are known to the art. According to one known technique, the objects are delivered to a row of mutually sequential bundling or stacking stations, in which the objects are bundled on a raisable and lowerable bottom device at respective locations, and wherein bundled objects are placed on conveyors which move along the rows of bundling stations and later removed therefrom. This known technique is encumbered with a number of serious draw-backs. For instance, the arrangement of rows of bundling stations and a conveyor which is common to all said stations places serious restrictions on the speed at which the objects can be sorted, while requiring the use of an intricate control system.

EP-A-0 352 374 and WO 91/08974 discloses technique according to which bundles are formed by adding each new object on top of preceding, stationary objects, which calls for vertically movable bundle platforms. This extends the system vertically and reduces the flexibility of choice and change of bundle size.

Previously known is also technique according to GB-A-1 424 182 and GB-A-2 025 372. However, such technique does not involve the problem of arranging objects in bundles using a grouping device temporarily halting the flow of objects in order to create a gap, which divides the objects for two successive bundles.

The present invention provides a method and an arrangement which enables the objects to be sorted very quickly and which include significant simplifications in comparison with the known methods and arrangements of the kind meant here.

Thus, the invention relates to a method of sorting sheet-like objects into bundled groups, in which the objects are advanced in rows. The objects are arranged in a fishscale-like configuration in which each object is partially overlapped by an immediately preceding object, as seen in the direction of advancement, the objects being stacked together from beneath.

The invention also relates to an arrangement for sorting sheet-like objects into bundled groups which include conveyor means for advancing the objects in rows.

The arrangement comprises devices which are active in placing the objects in a fishscale-like configuration, in which each objects is partially overlapped by an immediately preceding object as seen in the direction of advancement, and devices which are active in stacking the objects from beneath.

The invention will now be described in more detail with reference to exemplifying embodiments thereof and also with reference to the accompanying drawing, in which

Figure 1 is a schematic overhead view of a first embodiment of an inventive arrangement, in which the objects are moved from the right to the left in the Figure, and in which Figure no objects have been shown for the sake of clarity; and

Figure 2 illustrates the arrangement shown in Figure 1 from beneath the arrangement.

Figure 1 shows sheet-like objects 1 which are intended to be sorted by the inventive arrangement into bundles 2 in a predetermined fashion. The arrangement includes primarily an object aligning and conveying section 3 and an object grouping section 4.

The objects can be introduced into the object aligning and conveying section 3 from the front of said section, i.e. in the main object conveying direction of the arrangement, as indicated by an arrow 5 in Figure 1, or from the side of said section, as indicated by an arrow 6 in Figure 1. The objects are brought into edge-alignment with one another in the aligning section 3 against a side bar 7 with the aid of an obliquely positioned feeder 8, such as a belt 8, and advanced in said section towards the object grouping section 4.

The grouping section 4 is constructed to orientate the objects 1 in a fishscale-like configuration at that end of the section which faces towards the aligning and conveying section, such that the objects will be partially overlapped by a respective preceding object, as seen in the direction of advancement. According to one preferred embodiment, the arrangement includes a braking and lifting device 10 which is passed by the objects and which functions to brake respective objects and to raise the rear part 11 of said objects, so that the immediately following object will be partially overlapped by the braked and raised preceding object, as illustrated schematically in Figure 2. In the case of the illustrated, exemplifying embodiment, the lifting and braking device includes roller means 12, which in the Figure 1 embodiment have the form of disc-shaped rollers 12 which rotate about an axle 13 which extends transversely to the direction in which the objects are advanced such as to lift said objects, and also braking means 14 in the form of roller means 15, which in the illustrated case have the form of disc-shaped rollers 15 which rotate about an axle 16 which extends transversely to the direction in which the objects are advanced and which functions to slow down the objects in their respective raised positions, so that the next following object will be partially inserted beneath the immediately preceding object. The brake means or object retarding means 14 can be adjusted in the conveying direction, so as to adapt to the current sizes of the objects, as indicated by

the double-headed arrow 17 in Figure 1.

The illustrated arrangement also includes a stacking or bundling device 18 which functions to stop the fishscale-configured stream of objects so as to form a bundle 2, as a result of following objects being continuously inserted beneath preceding objects which have been stopped by the stacking device 18 and therewith form a stack or bundle of objects, as shown schematically in Figure 2. In the case of the illustrated, preferred embodiment, the stacking device includes a forked member 19 which is provided with upwardly turned stop shoulders 20 against which the objects are intended to be stopped. The forked member 19 is pivotal about an axle 21 which extends transversely to the object conveying direction and which is intended to be held in a stop position by means of a spring force, and which is rotated counter-clockwise in Figure 2 against said spring force by means of an electromagnetic pulling device 22, wherein the stop shoulders are intended to be lowered so that the objects/bundles that are stopped by the stop shoulders can be released for further transportation.

As will be seen from the drawing, the arrangement includes a grouping device 23 which is located upstream of the stacking device and which functions to stop the flow of mutually overlapping objects so as to create an interruption in the flow upstream of said stacking device, this interruption being intended to delimit two mutually sequential groups of objects, as shown schematically in Figure 2.

The grouping device includes a forked member 19 of the same kind as that included in the stacking device for stopping and releasing objects.

The illustrated arrangement also includes a first sensor 24 which detects the last object 1' that is allowed through by the grouping device prior to an interruption and which also sends to the grouping device a signal instructing the device to release the stream of objects. The arrangement also includes a second sensor 25 which detects the last object 1' to be allowed to pass through and also functions to send to the stacking device a signal instructing said device to release the bundle 2' in which the object 1' is at the bottom of the bundle. The arrangement also includes a third sensor 26 which detects when the bundle 2' has been released from the stacking device and has left the device, and functions to send to the stacking device a signal which causes the stream of objects to be stopped and a further bundle formed.

The grouping device is constructed to be activated in a manner to cause an interruption in the stream of objects in receipt of a signal sent from a sign reader 27 which is located upstream of the grouping device and which functions to distinguish between the different objects in the object stream by means of distinguishing marks on said objects and/or by means of a height detecting means 28 which functions to detect the height of a bundle formed in the vicinity of the stacking device.

The aforesaid last object 1' which is allowed to pass through is drawn past the grouping device by means of rollers 29.

A fourth sensor 30 is provided in the vicinity of the object braking and lifting device and functions to detect errors in the fishscale-like configuration of the objects and to send a signal to the grouping device instructing said device to stop the stream of objects when such a fault is detected.

The reference numeral 31 identifies belts which form part of a grouping section conveyor 32, which is active to draw, convey, the objects through the grouping section.

The method according to the present invention and also the manner of operation of the inventive arrangement will be understood in all essentials from the foregoing. Thus, subsequent to the objects being brought into edge-alignment, the objects are arranged in a fishscale-like configuration and stacked together from beneath in the stacking device, in which the objects are stopped. The stream of mutually overlapping objects is divided by the grouping device into bundles which correspond to different groups or classes of objects.

It will also be understood that the invention enables objects to be sorted quickly and reliably. The invention has been described in the foregoing with reference to mainly one embodiment thereof. It will be understood, however, that other embodiments and minor modifications are conceivable, without departing from the inventive concept.

The devices 24, 25, 30, 26, 27, 28 for detecting objects, bundles, distinguishing between the different objects and for detecting the heights of the bundles are suitably of a known kind.

According to one preferred embodiment of the invention, the sign reader 27 is an optical reader, for instance a black/white reader, for contactless detection and identification of signs or markings on the objects and/or for counting the objects.

Similarly, according to one preferred embodiment of the invention, the sensors 24, 25, 26 and 30 include photo-readers which detect reflected light and therewith detect whether or not an object is located in the position monitored by a respective sensor.

The height detector 28 will preferably include level sensors which function to detect bundle height, and particularly when a predetermined bundle height has been reached, said level sensors being arranged essentially transversely to the height direction of the bundle 2'. The level sensor 28 may also be of a kind which includes distance measuring means active in measuring the distance to the upper surface of the bundle 2'.

The inventive arrangement may include a more or less intricate control system, not shown. In the case of the aforesaid embodiment, it is possible to avoid the need for a main or supervisory control system, since the different sensors are able to control the process of sorting the objects into respective bundles and groups

in an unequivocal manner. The control system may, in the present respect, include devices which enable the division of the objects into groups in response to a signal delivered by a level sensor 28 or a sign reader 27, or by both in combination. A more active control system can also be envisaged, in which the conveying speed of the conveyor 32 is detected by means of a pulse disc or in some other suitable known manner, and in which, among other things, predetermined delays are introduced while taking the conveyor speed into account, so as to achieve the aforescribed working method of the arrangement.

As will be understood from the foregoing, one sorting criterion with regard to the division of bundled groups can be the type of object concerned, so that different types of objects will be sorted into respective different bundles and/or the division can be effected in accordance with the height of the bundles, so that the objects will be sorted into bundles of predetermined heights. Another sorting criterion which can be used separately or in combination with one or more of the other criteria may be the number of objects concerned.

The invention is thus not restricted to the described and illustrated embodiments, since variations can be made within the scope of the following Claims.

Claims

1. A method for sorting sheet-like objects into groups to form bundles or stacks (2, 2'), in which the objects are advanced in rows and then arranged in a fishscale-like configuration, **characterized** by halting a flow of, in a fishscale-like configuration, partially overlapping objects, in which a following object is partially inserted beneath a respective preceding object as seen in the direction of advancement, by means of a grouping device (23), such as to interrupt the flow of objects, this interruption mutually separating two mutually sequential groups of objects, prior to halting the stream of mutually overlapping objects of a group with the aid of a stacking device (18), and forming said bundle or stack (2, 2') of objects by continuously inserting the objects of the group beneath preceding stationary objects, to form said bundle or stack.
2. A method according to Claim 1, **characterized** by passing the row of objects through a lifting device (12, 13) which functions to hold the rear part (11) of respective objects in a raised position while the next following object is inserted partially beneath the lifted part of the immediately preceding object.
3. A method according to Claim 1 or 2, **characterized** by releasing a bundle (2, 2') containing a predetermined number of objects through the agency of the stacking device, and transporting said bundle away.
4. A method according to Claim 1, 2 or 3, **characterized** by detecting the last object (1') that the grouping device allows to pass through prior to an interruption, wherein the stream of objects is released by means of the grouping device when said last object has passed a predetermined position between the stacking device and the grouping device; and by releasing the bundle (2') in which said object forms the bottommost object, through the agency of the stacking device, whereafter the object stream is again halted by means of the stacking device.
5. A method according to Claim 1, 2, 3 or 4, **characterized** by activating the grouping device to cause an interruption in the object stream in response to a signal delivered by a sign reader (27) which is located upstream of the grouping device and which functions to detect the nature of the objects in the object stream and/or count said objects (1), and/or delivered by a height detector (28) which functions to detect the height of a bundle formed in the vicinity of the stacking device.
6. A method according to Claim 1, 2, 3, 4 or 5, **characterized** by halting the stream of objects to the grouping device when a fault is detected in the fishscale-like configuration of the objects.
7. A method according to Claim 1, 2, 3, 4, 5 or 6, **characterized** by bringing the objects into edge-align, against a side bar (7) with the aid of an obliquely positioned feeder (8) prior to arranging the objects in said fishscale-like configuration.
8. An arrangement for sorting sheet-like objects into groups to form bundles or stacks (2, 2'), comprising conveyor means (3) for advancing the objects in rows and devices (10-16), which are active in arranging the objects into a fishscale-like configuration, **characterized** in that said devices (10-16) are active to arrange the objects into a fishscale-like configuration, in which an object is partially inserted beneath an immediately preceding object as seen in the direction of advancement, a grouping device (23) being provided, which is active to halt a stream of said fishscale-like configured objects so as to create an interruption in said stream upstream of a stacking device (18), said interruption being intended to delimit two mutually sequential groups of objects, said stacking device (18) being active to halt the stream of said fishscale-like configured objects of a group, such that a continuous stream of the objects of the group will be inserted beneath the preceding, stationary objects to form said bundle or stack (2, 2').
9. An arrangement according to Claim 8, **character-**

ized by a braking and lifting device (10), which is intended to be passed by said objects in rows and which is active in holding the rear part (11) of respective objects in a raised position while part of an immediately following object is inserted beneath the raised preceding object.

10. An arrangement according to Claim 9, **characterized** in that the braking and lifting device (10) includes roller means (12) which are rotatable about an axle (13) which extends transversely to the direction in which the objects are advance, so as to raise said objects.

11. An arrangement according to Claim 9 or 10, **characterized** in that the braking and lifting device (10) includes braking means (15) preferably in the form of roller means (15) which are rotatable about an axle (16) which extends transversely to the direction of advancement of the objects and which functions to halt objects in a partially raised position effected by said lifting device, so that the next arriving object will be inserted partially beneath the immediately preceding object.

12. An arrangement according to Claim 8, 9, 10 or 11, **characterized** by devices (19, 20, 21, 22) which function to release a bundle of predetermined size formed by said stacking device (18), and to carry away said bundle.

13. An arrangement according to Claim 8, 9, 10, 11 or 12, **characterized** by sensor means (24, 25, 26) which function to detect the last object (1') which is allowed to pass by the grouping device prior to an interruption and to deliver a signal to the stacking device for releasing the bundle (2') in which the last object (1') forms the bottommost object, and to deliver a signal to the grouping device to release the stream of objects when said last object has passed a predetermined position between the stacking device and the grouping device, and to deliver a signal to the stacking device instructing said device to again halt the flow of objects so as to form a new bundle.

14. An arrangement according to Claim 8, 9, 10, 11, 12, or 13, **characterized** in that the grouping device is intended to be activated to create an interruption in the object stream in response to a signal from a sign reader (27) located upstream of the grouping device and functioning to detect the nature of the objects in said stream and/or to count said objects with the aid of signs or markings on the objects and/or in response to a signal delivered by a height sensor (28) which functions to detect the height of a bundle formed in the vicinity of the stacking device.

15. An arrangement according to Claim 8, 9, 10, 11, 12, 13 or 14, **characterized** by devices (30) which function to detect a fault in the fishscale-like configuration of the objects and to stop the stream of objects to the grouping device when such a fault is detected.

16. An arrangement according to Claim 8, 9, 10, 11, 12, 13, 14 or 15, **characterized** by an obliquely positioned feeder (8) which functions to bring the objects into edge-alignment against a side bar (7) prior to orientating said objects in said fishscale-like configuration.

Patentansprüche

1. Verfahren zum Sortieren blattartiger Gegenstände, um Stöße oder Stapel (2, 2') zu bilden, bei dem die Gegenstände in Reihen vorwärts bewegt und dann in einer fischschuppenartigen Konfiguration angeordnet werden, **gekennzeichnet durch** Anhalten eines Stroms von einander fischschuppenartig teilweise überlappender Gegenstände, in dem, in Vorwärtsbewegungsrichtung gesehen, ein nachfolgender Gegenstand teilweise unter einen jeweils vorausseilenden Gegenstand eingeführt ist, mittels einer Gruppierungseinrichtung (23), um so den Strom von Gegenständen zu unterbrechen, wobei diese Unterbrechung zwei aufeinanderfolgende Gruppen von Gegenständen voneinander trennt, bevor der Strom aus einander überlappenden Gegenständen einer Gruppe mit Hilfe einer Stapel-einrichtung (18) angehalten wird, und Formen des Stoßes oder des Stapels (2, 2') aus Gegenständen durch kontinuierliches Einbringen der Gegenstände der Gruppe unter vorangehende, stationäre Gegenstände, um den Stoß oder den Stapel zu bilden.

2. Verfahren nach Anspruch 1, **gekennzeichnet durch** Hindurchführen der Reihe von Gegenständen durch eine Anhebeeinrichtung (12, 13), die dazu dient, das hintere Teil (11) jeweiliger Gegenstände in einer angehobenen Position zu halten, während der nachfolgende Gegenstand teilweise unter den angehobenen Teil des unmittelbar vorausseilenden Gegenstands eingeführt wird.

3. Verfahren nach Anspruch 1 oder 2, **gekennzeichnet durch** Freigeben eines Stoßes (2, 2'), der eine vorbestimmte Anzahl an Gegenständen beinhaltet, mittels der Stapel-einrichtung, und Wegtransportieren des Stoßes.

4. Verfahren nach Anspruch 1, 2 oder 3, **gekennzeichnet durch** Erfassen des letzten Gegenstands (1'), dem es die Gruppierungseinrichtung vor einer Unterbrechung erlaubt hindurchzugehen, wobei

der Strom von Gegenständen mittels der Gruppierungseinrichtung freigegeben wird, wenn der letzte Gegenstand eine vorbestimmte Position zwischen der Stapeleinrichtung und der Gruppierungseinrichtung durchlaufen hat, und durch Freigeben des Stoßes (2'), in dem der besagte Gegenstand der unterste Gegenstand ist, mit Hilfe der Stapeleinrichtung, woraufhin der Strom von Gegenständen wieder durch die Stapeleinrichtung angehalten wird.

5. Verfahren nach Anspruch 1, 2, 3 oder 4, **gekennzeichnet, durch** Aktivieren der Stapeleinrichtung, um eine Unterbrechung in dem Strom von Gegenständen auf ein Signal hin zu bewirken, das durch einen Zeichenleser (27) geliefert wird, der stromaufwärts der Gruppierungseinrichtung plaziert ist und dazu dient, die Art der Gegenstände in dem Strom von Gegenständen festzustellen und/oder die Gegenstände zu zählen, und/oder das durch einen Höhendetektor (28) geliefert wird, der dazu dient, die Höhe eines in der Nähe der Stapeleinrichtung gebildeten Stoßes festzustellen.
6. Verfahren nach Anspruch 1, 2, 3, 4 oder 5, **gekennzeichnet durch** Anhalten des Stroms von Gegenständen zu der Gruppierungseinrichtung, wenn ein Fehler in der fischschuppenartigen Anordnung der Gegenstände erfaßt wird.
7. Verfahren nach Anspruch 1, 2, 3, 4, 5 oder 6, **gekennzeichnet, durch** Ausrichten der Kanten der Gegenstände an einer Seitenleiste (7) mit Hilfe eines schräg positionierten Beschickungsmittels (8), bevor die Gegenstände in der fischschuppenartigen Anordnung angeordnet werden.
8. Anordnung zum Sortieren blattartiger Gegenstände in Gruppen, um Stöße oder Stapel (2, 2') zu bilden, umfassend Transportmittel (3) zum Vorwärtsbewegen der Gegenstände in Reihen und Einrichtungen (10-16), die beim Anordnen der Gegenstände in einer fischschuppenartigen Konfiguration tätig sind, **dadurch gekennzeichnet, daß** die Einrichtungen (10-16) tätig sind, um die Gegenstände in einer fischschuppenartigen Konfiguration anzuordnen, in der ein Gegenstand, in Vorwärtsbewegungsrichtung gesehen, teilweise unter einen unmittelbar vorangehenden Gegenstand eingeführt ist, wobei eine Gruppierungseinrichtung (23) vorhanden ist, die einen Strom von den fischschuppenartig angeordneten Gegenständen anhält, um so stromaufwärts einer Stapeleinrichtung (18) eine Unterbrechung in dem Strom zu bewirken, wobei die Unterbrechung dazu bestimmt ist, zwei aufeinanderfolgende Gruppen von Gegenständen abzugrenzen, wobei die Stapeleinrichtung (18) tätig ist, um den Strom von den fischschuppenartig ange-

ordneten Gegenständen einer Gruppe anzuhalten, so daß ein kontinuierlicher Strom von den Gegenständen der Gruppe unter die vorangehenden, stationären Gegenstände eingeführt werden wird, um den Stoß oder den Stapel (2, 2') zu bilden.

9. Anordnung nach Anspruch 8, **gekennzeichnet durch** eine Brems- und Anhebeeinrichtung (10), die dazu bestimmt ist, von den Gegenständen in Reihen durchlaufen zu werden, und die das hintere Teil (11) jeweiliger Gegenstände in einer angehobenen Position hält, während ein Teil eines unmittelbar nachfolgenden Gegenstands unter den angehobenen, vorausseilenden Gegenstand eingeführt wird.
10. Anordnung nach Anspruch 9, **dadurch gekennzeichnet, daß** die Brems- und Anhebeeinrichtung (10) Rollen (12) beinhaltet, die um eine Achse (13) drehbar sind, welche sich quer zur Richtung erstreckt, in der die Gegenstände vorwärts bewegt werden, um so die Gegenstände anzuheben.
11. Anordnung nach Anspruch 9 oder 10, **dadurch gekennzeichnet, daß** die Brems- und Anhebeeinrichtung (10) ein Bremsmittel (15) beinhaltet, vorzugsweise in Gestalt von Rollen (15), die um eine Achse (16) drehbar sind, welche sich quer zur Vorwärtsbewegungsrichtung der Gegenstände erstreckt, und die dazu dient, Gegenstände in einer teilweise angehobenen Position, die durch die Anhebeeinrichtung bewirkt wurde, zu halten, so daß der nächste ankommende Gegenstand teilweise unter den unmittelbar vorangehenden Gegenstand eingeführt wird.
12. Anordnung nach Anspruch 8, 9, 10 oder 11, **gekennzeichnet, durch** Einrichtungen (19, 20, 21, 22), die dazu dienen, einen Stoß mit vorbestimmter Größe, der durch die Stapeleinrichtung gebildet ist, freizugeben, und dazu dienen, den Stoß wegzuführen.
13. Anordnung nach Anspruch 8, 9, 10, 11 oder 12, **gekennzeichnet durch** Sensormittel (24, 25, 26), die dazu dienen, den letzten Gegenstand (1'), dem es vor einer Unterbrechung erlaubt ist, durch die Gruppierungseinrichtung hindurchzugehen, zu erfassen, und die dazu dienen, der Stapeleinrichtung ein Signal zum Freigeben des Stoßes (2'), in dem der letzte Gegenstand (1') der unterste Gegenstand ist, zuzuführen, und die dazu dienen, der Gruppierungseinrichtung ein Signal zum Freigeben des Stroms von Gegenständen zuzuführen, wenn der letzte Gegenstand eine vorbestimmte Position zwischen der Stapeleinrichtung und der Gruppierungseinrichtung durchlaufen hat, und die dazu dienen, der Stapeleinrichtung ein Signal

zuzuführen, das die Einrichtung instruiert, den Strom von Gegenständen wieder anzuhalten, um einen neuen Stoß zu bilden.

14. Anordnung nach Anspruch 8, 9, 10, 11, 12 oder 13, **dadurch gekennzeichnet, daß** die Gruppierungseinrichtung dazu bestimmt ist, aktiviert zu werden, um auf ein Signal von einem Zeichenleser (27) hin, eine Unterbrechung in dem Strom von Gegenständen zu erzeugen, wobei der Zeichenleser stromaufwärts der Gruppierungseinrichtung (19) liegt und dazu dient, anhand von Zeichen oder Markierungen auf den Gegenständen die Art der Gegenstände in dem Strom festzustellen und/oder die Gegenstände zu zählen, und/oder auf ein Signal hin, das durch einen Höhsensor (28) geliefert wird, der dazu dient, die Höhe eines in der Nähe der Stapeleinrichtung gebildeten Stoßes festzustellen. 5
15. Anordnung nach Anspruch 8, 9, 10, 11, 12, 13 oder 14, **gekennzeichnet durch** Einrichtungen (30), die dazu dienen, einen Fehler in der fischschuppenartigen Anordnung der Gegenstände zu erfassen und den Strom aus Gegenständen zu der Gruppierungseinrichtung hin anzuhalten, wenn ein derartiger Fehler festgestellt wird. 10 15 20 25
16. Anordnung nach Anspruch 8, 9, 10, 11, 12, 13, 14 oder 15, **gekennzeichnet durch** ein schräg positioniertes Beschickungsmittel (8), das dazu dient, die Gegenstände, mit der Kante an einer Seitenleiste (7) auszurichten, bevor die Gegenstände in der fischschuppenartigen Anordnung ausgerichtet werden. 30 35

Revendications

1. Procédé pour trier des objets analogues à des feuilles en groupes pour former des liasses ou piles (2, 2'), dans lequel les objets sont avancés en rangées puis disposés dans une configuration analogue à des écailles de poisson, caractérisé en ce qu'on arrête un flux d'objets se chevauchant partiellement, dans une configuration analogue à des écailles de poisson, dans lequel un objet suivant est partiellement inséré au-dessous d'un objet précédent respectif tel que vu dans le sens d'avance, au moyen d'un dispositif de groupage (23), afin d'interrompre le flux d'objets, cette interruption séparant mutuellement deux groupes mutuellement consécutifs d'objets, avant d'arrêter le courant d'objets, se chevauchant mutuellement, d'un groupe à l'aide d'un dispositif d'empilage (18), et en ce qu'on forme ladite liasse ou pile (2, 2') d'objets en insérant en continu les objets du groupe au-dessous des objets immobiles précédents, pour former ladite liasse ou pile. 40 45 50 55
2. Procédé selon la revendication 1, caractérisé en ce qu'on fait passer la rangée d'objets à travers un dispositif élévateur (12, 13) qui fonctionne de façon à maintenir la partie arrière (11) d'objets respectifs dans une position élevée tandis que l'objet immédiatement suivant est inséré partiellement au-dessous de la partie élevée de l'objet immédiatement précédent.
3. Procédé selon la revendication 1 ou 2, caractérisé en ce qu'on libère une liasse (2, 2') contenant un nombre prédéterminé d'objets par l'intermédiaire du dispositif d'empilage, et on transporte ladite liasse à l'écart. 10 15
4. Procédé selon la revendication 1, 2 ou 3, caractérisé en ce qu'on détecte le dernier objet (1') que le dispositif de groupage laisse passer avant une interruption, dans lequel le courant d'objets est libéré au moyen du dispositif de groupage lorsque ledit dernier objet a franchi une position prédéterminée entre le dispositif d'empilage et le dispositif de groupage ; et on libère la liasse (2') dans laquelle ledit objet forme l'objet le plus bas, par l'intermédiaire du dispositif d'empilage, après quoi le courant d'objets est de nouveau arrêté au moyen du dispositif d'empilage. 20 25
5. Procédé selon la revendication 1, 2, 3 ou 4, caractérisé en ce qu'on active le dispositif de groupage pour provoquer une interruption du courant d'objets en réponse à un signal délivré par un lecteur (27) de signes qui est placé en amont du dispositif de groupage et qui fonctionne de façon à détecter la nature des objets dans le courant d'objets et/ou à compter lesdits objets (1), et/ou délivré par un détecteur (28) de hauteur qui fonctionne de façon à détecter la hauteur d'une liasse formée au voisinage du dispositif d'empilage. 30 35
6. Procédé selon la revendication 1, 2, 3, 4 ou 5, caractérisé en ce qu'on arrête le courant d'objets vers le dispositif de groupage lorsqu'un défaut est détecté dans la configuration des objets analogue à des écailles de poisson.
7. Procédé selon la revendication 1, 2, 3, 4, 5 ou 6, caractérisé en ce qu'on amène les objets en alignement par le bord, contre une barre latérale (7) à l'aide d'un guide (8) positionné obliquement avant d'agencer les objets dans ladite configuration analogue à des écailles de poisson.
8. Agencement pour trier des objets analogues à des feuilles en groupes pour former des liasses ou piles (2, 2'), comportant des moyens transporteurs (3) destinés à faire avancer les objets en rangées et des dispositifs (10-16) qui sont actifs dans l'agen-

cement des objets dans une configuration analogue à des écailles de poisson, caractérisé en ce que lesdits dispositifs (10-16) sont actifs pour agencer les objets dans une configuration analogue à des écailles de poisson, dans laquelle un objet est partiellement inséré au-dessous d'un objet immédiatement précédent tel que vu dans la direction d'avance, un dispositif de groupage (23) étant prévu, lequel est actif pour arrêter un courant desdits objets dans une configuration analogue à des écailles de poisson afin d'engendrer une interruption dans ledit courant en amont d'un dispositif d'empilage (18), ladite interruption étant destinée à délimiter deux groupes mutuellement consécutifs d'objets, ledit dispositif d'empilage (18) étant actif pour arrêter le courant desdits objets d'un groupe, dans la configuration analogue à des écailles de poisson, de façon qu'un courant continu des objets du groupe soit inséré au-dessous des objets immobiles, précédents, pour former ladite liasse ou pile (2, 2').

9. Agencement selon la revendication 8, caractérisé par un dispositif (10) de freinage et d'élévation, qui est destiné à être franchi par lesdits objets en rangées et qui est actif pour maintenir la partie arrière d'objets respectifs dans une position élevée tandis qu'une partie d'un objet immédiatement suivant est insérée au-dessous de l'objet précédent élevé.
10. Agencement selon la revendication 9, caractérisé en ce que le dispositif (10) de freinage et d'élévation comprend des moyens à rouleaux (12) qui peuvent tourner autour d'un axe (13) qui s'étend transversalement à la direction dans laquelle les objets avancent afin d'élever lesdits objets.
11. Agencement selon la revendication 9 ou 10, caractérisé en ce que le dispositif (10) de freinage et d'élévation comprend des moyens de freinage (15) avantageusement sous la forme de moyens à rouleaux (15) qui peuvent tourner autour d'un axe (16) qui s'étend transversalement à la direction d'avance des objets et qui fonctionnent de façon à arrêter lesdits objets dans une position partiellement élevée, établie par ledit dispositif d'élévation, afin que l'objet arrivant ensuite soit inséré partiellement au-dessous de l'objet immédiatement précédent.
12. Agencement selon la revendication 8, 9, 10 ou 11, caractérisé par des dispositifs (19, 20, 21, 22) qui fonctionnent de façon à libérer une liasse d'une dimension prédéterminée formée par ledit dispositif d'empilage (18), et à évacuer ladite liasse.

13. Agencement selon la revendication 8, 9, 10, 11 ou

12, caractérisé par des moyens capteurs (24, 25, 26) qui fonctionnent de façon à détecter le dernier objet (1') que le dispositif de groupage laisse passer avant une interruption, et à délivrer un signal au dispositif d'empilage pour libérer la liasse (2') dans laquelle le dernier objet (1') forme l'objet le plus bas, et à délivrer un signal au dispositif de groupage pour libérer le courant d'objets lorsque ledit dernier objet a franchi une position prédéterminée entre le dispositif d'empilage et le dispositif de groupage, et à délivrer un signal au dispositif d'empilage demandant par instruction audit dispositif d'arrêter de nouveau le flux d'objets afin de former une nouvelle liasse.

14. Agencement selon la revendication 8, 9, 10, 11, 12 ou 13, caractérisé en ce que le dispositif de groupage est destiné à être activé pour engendrer une interruption dans le courant d'objets en réponse à un signal provenant d'un lecteur (27) de signes placé en amont du dispositif de groupage et fonctionnant de façon à détecter la nature des objets dans ledit courant et/ou à compter lesdits objets à l'aide de signes ou de marquages sur les objets et/ou en réponse à un signal délivré par un capteur (28) de hauteur qui fonctionne de façon à déterminer la hauteur d'une liasse formée au voisinage du dispositif d'empilage.
15. Agencement selon la revendication 8, 9, 10, 11, 12, 13 ou 14, caractérisé par des dispositifs (30) qui fonctionnent de façon à détecter un défaut dans la configuration des objets, analogue à des écailles de poisson, et à arrêter le courant d'objets vers le dispositif de groupage lorsqu'un tel défaut est détecté.
16. Agencement selon la revendication 8, 9, 10, 11, 12, 13, 14 ou 15, caractérisé par un guide (8) positionné obliquement qui fonctionne de façon à amener les objets en alignement par le bord contre une barre latérale (7) avant d'orienter lesdits objets dans ladite configuration analogue à des écailles de poisson.

