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(11) **EP 0 987 207 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
22.03.2000 Bulletin 2000/12

(51) Int. Cl.⁷: **B65H 33/12**, B65H 29/66,
B65H 31/32

(21) Application number: **99610041.8**

(22) Date of filing: **29.07.1999**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **24.08.1998 DK 105898**

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(54) **Method and arrangement for group-dividing of folded printed matter**

(57) For the temporary blocking of a flow of folded newspapers which are fed in overlapping scale formation on a conveyor belt, e.g. for the bundling of the newspapers, it is known to introduce a stop element down against the upper side of the newspaper track, so that the following newspapers are held back, while the underlying newspapers continue to be conveyed away from the relevant overlapping area. This can give rise to distinct smudging effects, which with the invention are avoided in that at the lower end of the stop element (32) there is provided a sheet tongue (34) which is inclined slightly downwards and which extends outwards against

the newspaper flow, and which when the stop element is lowered will wedge itself in under the front edge of the next following newspaper, and hereby absorb a great part of the weight load of the overlying newspapers down against the newspapers which continue to be fed. The stop element is preferably introduced in the longitudinal direction of the sheet tongue, so that when deactivated the sheet tongue is quickly retracted substantially in the direction in which the newspapers are conveyed, whereby the newspapers which have been blocked are immediately released for further feeding forward.

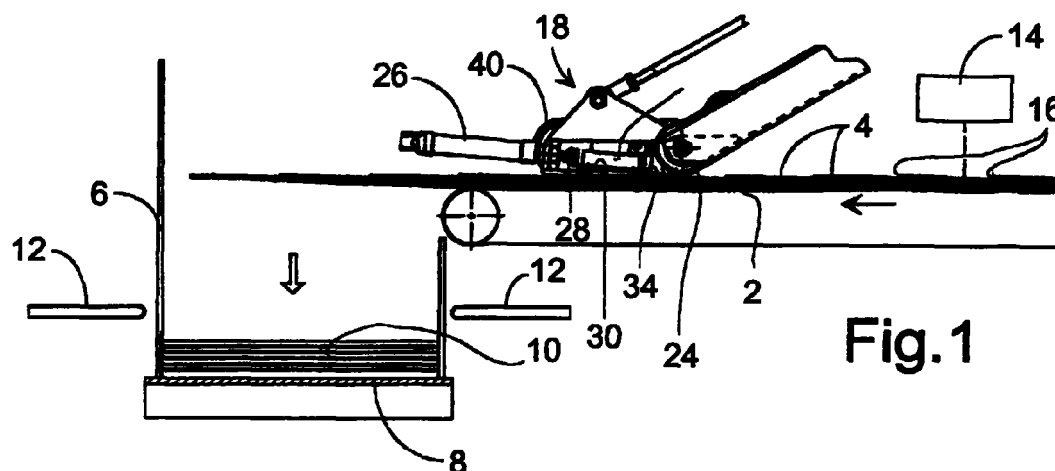


Fig.1

EP 0 987 207 A1

Description

[0001] The present invention concerns a method and an arrangement for the group-dividing of folded printed matter, primarily newspapers, which are conveyed in a continuous flow in overlapping scale formation on a conveyor belt. It is normal that freshly-printed newspapers leave the rotary printing press in a flow, with the fold-edge foremost in the direction of transport and resting on top of the preceding newspaper, and it is well-known that it can hereby be desirable to bring about a certain dividing of the continuous flow with the view to being able with suitable means to separate finished stacks of newspapers from the flow for further handling. For this purpose, it is necessary for a certain pause or "hole" to be created in the flow of newspapers, so that the gripping means used for collection can begin the collection of such a stack in a well-defined manner.

[0002] In that the feeding of the items is effected on a conveyor belt which is substantially smooth and which generates only limited friction, in principle it is a simple task to create such a pause in the continuous flow, in that by influence from above the items can be scraped along the belt, and it is well-known to effect such a scraping by establishing a friction layer between a scraping element and the top of that or those items which abut up to the desired separation area. It has been ascertained, however, that the scraper element can cause damage to the freshly-printed images on that or those items with which it comes into contact.

[0003] In view of this, the object of the invention is to provide a separation arrangement which in a gentle manner can create a separation of or in the item flow, so that smudging and blurring of the printing ink or other damage to the items can be avoided.

[0004] According to the invention, this object can be achieved by carrying out a detection near the dividing point of the passage of the front edges of the items arriving in a flow, and that on the basis hereof and at the desired time to quickly bring about an activation of an overlying sheet tongue for lowering/displacement towards the flow of items in such a manner that this sheet tongue will in a well-defined manner wedge itself under the folded, upper front edge of a given item and the top of the item lying underneath, so that the upper item can be held back by the contact of the upper folded edge of this item against an upright root part of the sheet tongue, without the sliding forwards of the underlying item causing any smudging, the reason being that the inserted sheet tongue will hold the surfaces of these items separated from each other.

[0005] It is not necessary for the relevant sheet tongue to extend over the whole breadth of the item track, in that it will be fully sufficient for this to be configured as individual, mutually separated and thus relatively narrow sheet tongues.

[0006] There will naturally continue to be a sliding movement mutually between the items which are

stacked up against the said upright root part, but here the slide surfaces are loaded only by the uniform distribution of the weight of the overlying item, whereby smudging or blurring will not normally occur.

[0007] The said detection of the passing of the front edge can also be used for the controlling of a counter which can count the passage of a desired number of items for feeding together in separate bundles. When a desired number of items have been separated, the separation barrier can be broken a certain time thereafter by a quick withdrawal and subsequent raising of the sheet tongue in the transport direction of the items, after which the already detected number of accumulated items, which are stacked up against the barrier, can be fed forward together with a relevant number of newly conveyed items for the formation of a desired new item batch, and consequently for the re-activation of the separation mechanism.

[0008] In the following, the invention is explained in more detail with reference to the drawing, in which

fig. 1 is a side view of an arrangement according to the invention,

fig. 2 is a corresponding view shown in a second operation phase, and

fig. 3 is a plan view of the separation arrangement.

[0009] In fig. 1 there is shown a conveyor belt 2 which feeds a flow of scale-oriented items 4 from a rotary press forward to a fallout area in the form of a magazine shaft 6, which at the bottom has an outgoing conveyor belt 8 for a stack of items 10 built up on the belt. In this magazine there can be established an intermediate bottom by sideways insertion of outer bottom plates 12. A sensor 14 is provided above the belt 2 for detecting the passage of the upper front edges 16 of the items 4, whereby with the use of an associated counter it can be determined how many items shall be fed forward or the formation of a full stack 10. When this number has been reached, the intermediate bottom plates 12 are inserted to the position shown in fig. 2, i.e. over the desired stack formation 10, after which this can be led away on the belt 8 or a carriage corresponding hereto, while the further stacking can be carried out on the intermediate bottom 12 until this can be removed by the withdrawal of the elements 12 and allow the part stack formed hereon to fall down on to the re-established bottom surface 8. The building-up of the stack can thus continue by the feeding of individual items from the belt 2 until a new, full-stack batch has been formed.

[0010] In the feeding of the items 4 from a normal rotary press, the feeding speed is quite high, and in order to achieve a well-defined separation between the items for the building-up of the stacks with a specific number of items, it is desirable to establish a certain pause in or of the flow of these items to provide time for the insertion of the intermediate bottom plates 12 at a well-defined time.

[0011] With the invention, such a pause is established by providing a separation mechanism 18 over the conveyor belt 2, this mechanism 18 being suspended in a pivotal parallelogram control system 20 with a guide plate 22 and a roller 24, which is a lower changeover roller for an inclined, smooth belt 25 extending forwards and downwards, and which during operation rests down against the top of the item layer 4. Fastened at the front end of the guide plate 22 there is a compressed-air cylinder 26, the piston of which supports a lower, protruding sheet tongue 30, to which there is fastened an upright plate part 32, from which front edge the sheet tongue 30 has a short, forwardly-extending end part 34 configured with a rounded end shape and directed tangentially forward towards the underside of the roller 24.

[0012] As will be seen in fig. 3, two such systems are arranged in parallel with a distance between them, while between there is seen a further pivot system for the securing of a pair of intermediate rollers 38 and 40 which contribute towards stabilising the items, partly in the lateral direction and partly in connection with their feeding forwards to the magazine shaft 6. These rollers are driven by means of a belt 42, so that without sliding against the items 4 they can contribute towards the final launching out of these to the magazine shaft 6.

[0013] When the unit 14 detects that a predetermined number of items 4, or rather the front edges 16 of these items, has passed the rollers 24 for the building-up of a desired size of stack in the shaft 6, the air cylinders 26 are activated for a very quick forwards displacement of the sheet tongues 30, i.e. rearwards in relation the transport direction of the items 4. Because of the slightly inclined position of the cylinders 26 as shown, the outer ends 34 of the sheet tongues will hereby be displaced from a passive position just behind and slightly raised above the contact line of the rollers 24 against the top of the items 4, to an active position just in front and only slightly below this line, whereby the ends of the sheet tongues are brought into light contact with the top of that item which is currently being fed down under the rollers 24.

[0014] This displacement of the tongue ends can typically be activated precisely at the moment at which the item feeding phase is as shown in fig. 1, i.e. when the front edge 16 of the next item 4 is still lying at a certain distance from the rollers 24. It can be envisaged that the feeding of the items 4 can typically take place with a capacity in the order of 10-20 items per second, and that the activation must therefore be effected quickly in order for the sheet tongues to be able to reach forward to their active position before the arrival of the front edge 16 of the next item 4.

[0015] When this next front edge arrives in the area of the rollers 24, the ends 34 of the sheet tongues will automatically be wedged in the space underneath the leading end of the following item. The front edge of this following item will thus be induced upwards into abutment against the upright front edge of the plate ele-

ments 32 on the sheet tongues 30, whereby a blocking is effected against further feeding of the items 4, in that not only the first but also the following items will be fed forward on the belt 2 in such a way that their front edges 16 will abut against the front edge of the plates 32, whereby by abutment against these edges a modest stack of items can be built up, as shown in fig. 2, before the sheet tongue 30, 34 is withdrawn to its passive position. While this build-up is taking place, the preceding items 4 will be conveyed further, i.e. the pile of items down under the rollers 24 will gradually disappear, and even quite quickly, so that the whole separation system will sink down against the belt 2, which is precisely the position shown in fig. 2.

[0016] A withdrawal of the sheet tongues can be initiated as soon as - or immediately before - the intermediate bottom parts 12 are inserted for closing above the stack of items 10 which has been formed in the meantime (fig. 2). With this withdrawal, the items which have hitherto been held back will be released, so that these can now be fed further on the belt 2 and hereby be pressed in under the rollers 24 for the raising of these rollers, and herewith also for the raising of the now passive sheet tongues, after which the situation will again quickly become the same as shown in fig. 1. The building up will begin of a new stack of items on the intermediate bottom 12, which is opened as soon as the preceding stack has been led away on the belt 8.

[0017] The changeover in the stack magazine can possibly be effected so quickly that the situation shown in fig. 2 will almost never arise, in that it is possible to work with such a brief activation of the sheet tongues that only some of the underlying items 4 will manage to be fed further on the belt 2 before the sheet tongues are de-activated. There shall hereby merely be created such an interruption in the flow of items to the shaft 6 that there is time to establish the intermediate bottom 12 without any disturbances arising in the regular flow of items down into the shaft.

Claims

1. Method for the group dividing of folded printed products which are fed forward on a conveyor belt in overlapping scale formation, primarily newspapers from a rotary printing press, by which method a dividing plate for the holding back of subsequent products is displaced down towards the conveyor belt for the temporary retention of said products by the abutment of their front edge against the dividing plate, while initially underlying products can continue to be fed by their frictional engagement with the conveyor belt, **characterized** in that in order to avoid the strong skidding and smudging effects between the products which are fed and the products which are retained, use is made of a dividing plate or corresponding stop-face part (32) which is provided lowermost with an inclined, protruding

sheet tongue (34) extending against the product flow, and which is activated for displacement forwards and downwards in between the front edge passages of two neighbouring products, between which it is desired to effect a division.

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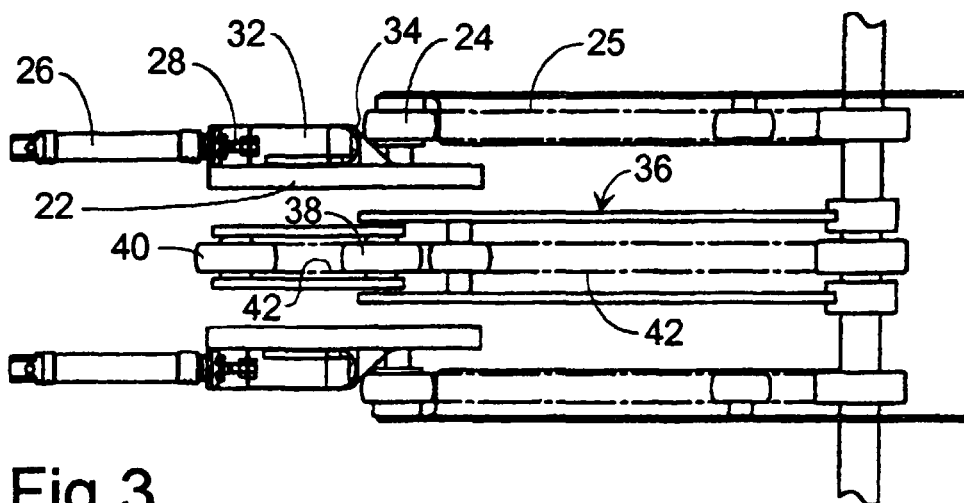
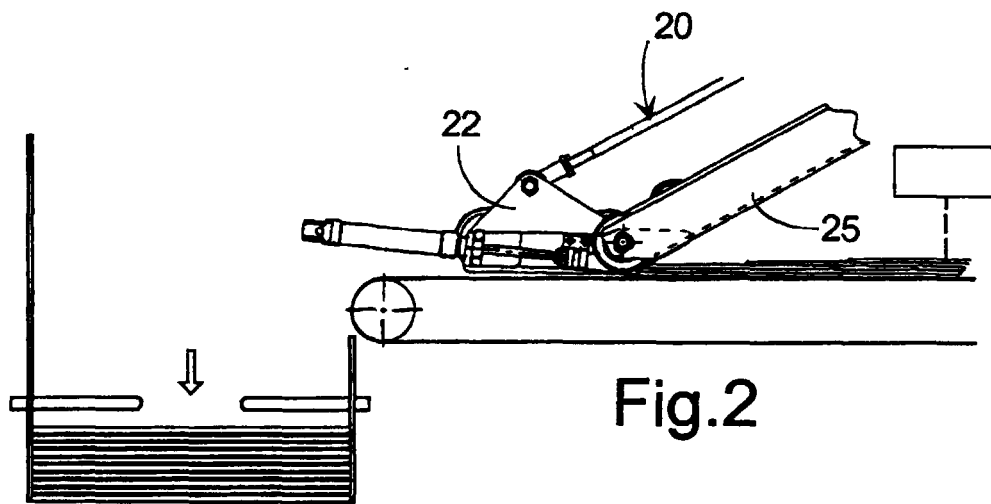
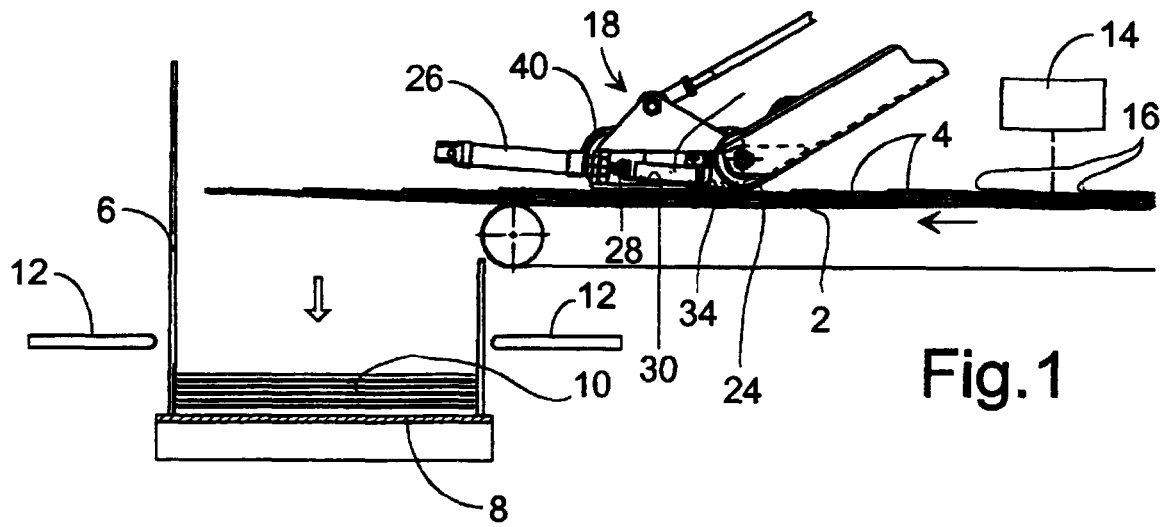
2. Apparatus for the execution of the method according to claim 1, comprising a stop element in the form of a dividing plate or stop-face element which is connected with means for controlled lowering of said element down against the upper side of a flow of overlapping printed products which are fed on an underlying conveyor belt with the object of temporary retention of a part of this flow, **characterized** in that the stop element is configured as a downwardly-extending stop-face (32) which at its lower end has a protruding sheet tongue (34) which slopes slightly downwards and extends against the product flow, and that the apparatus comprises means for the detection of the passing of the front-edges of the printed matter and for activation of lowering means sufficiently quickly after the passage of a front edge to enable the free end of the sheet tongue to be brought into an operative position opposite the underside of the front edge of the following item when this arrives at the end of the sheet tongue.
3. Apparatus according to claim 1, **characterized** in that the stop element is placed on a support chassis on the outer end of a pivot arm which is under-supported by rollers down against the product flow in the immediate vicinity of the operation area of the stop element, in that on this chassis there is mounted a controllable drive arrangement such as a compressed-air cylinder (26) which can be activated for quick and simultaneous forward and slightly downwards displacement of the stop element.
4. Apparatus according to claim 3, **characterized** in that the support chassis and the pivot arm constitute a parallelogram system.

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EUROPEAN SEARCH REPORT

Application Number
EP 99 61 0041

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	GB 1 009 263 A (VERKSTADSAKTIEBOLAGET MEKANO)	2	B65H33/12 B65H29/66 B65H31/32
A	* the whole document *	1	
Y	US 3 948 153 A (DUTRO ORVILLE V ET AL) 6 April 1976 (1976-04-06) * abstract; figures *	2	
A	PATENT ABSTRACTS OF JAPAN vol. 004, no. 045 (M-006), 9 April 1980 (1980-04-09) -& JP 55 016878 A (IKEGAI GOSU KK), 5 February 1980 (1980-02-05) * abstract; figures *	1,2	
A	US 3 768 382 A (ZERNOV P ET AL) 30 October 1973 (1973-10-30) * column 7, line 34 - line 64 *	1,2	
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 December 1999	Examiner Thibaut, E
<div>CATEGORY OF CITED DOCUMENTS</div> <div> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document </div> <div> T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document </div>			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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