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(54) **Stapler for printing systems**

(57) Apparatus and method and apparatus for inline buffering of sheets in a sheet processing apparatus, comprising the steps of feeding a first sheet into a transport nip, feeding a subsequent sheet overlapping onto the first sheet while the transport nip is engaged with the first

sheet, such that the relative velocity of the subsequent sheet with respect to the first sheet is substantially zero such that scraping of the subsequent sheet over the first sheet is minimized.

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Description

[0001] In stapling finishers such as known e.g. in printing systems, sheets can be collected to buffer sheets to keep productivity while stapling. A stapling action takes some time to perform and it is preferred that the print engine is not obliged to slowdown to compensate for this stapling time. It will be clear from the following that although the invention is described with a stapler, the invention can be applied in any printing system where sheets are to be buffered for some time, such as printing systems configured to perform stapling, binding, punching, gluing or the like finishing operations. Printing systems may be e.g. inkjet based, hot melt based, toner based or a sheet processing apparatus where no marking material is applied.

[0002] A known method of buffering works by stopping the first sheet in a nip and letting a second sheet slide over the first sheet in a second nip as displayed in figure 1. The first sheet is fed and stopped by nip 2. Then the second sheet is fed and collated with sheet 1. After some time the two sheets are transported together.

[0003] For this to work, the friction between rollers and sheets needs to be sufficiently larger than the inter-sheet friction. If this is not the case, then the resulting alignment between sheets is undefined. Furthermore the principle causes smearing of toner on the sheets.

[0004] Two alternative solutions are hereinafter described

Embodiment A

[0005] As soon as the second sheet reaches nip 1 the transport both sheets together as displayed in figure 2. In this method slip between the sheets is prevented by allowing an overlap of the sheets after collecting. The steps are shown in figure 2.

[0006] The first sheet is fed (A) and stopped in nip 2. Then a second sheet is fed (B). When the second sheet reaches nip 1, both nips are activated and the sheets are transported together, with overlap (C). Now the sheets can possibly be stopped, for example to wait for another action to finish (D). Finally the sheets can be transported together (E), after which they may need to be realigned.

Embodiment B

[0007] A variation on this is displayed in figure 3 where nip 1 is opened while the first sheet is laying still and closed again to transport the two sheets together Embodiment B is much like embodiment A, but in this alternative embodiment, nip 1 is never stopped but is opened, e.g. by a voice coil or any other way for opening the nip.

[0008] The first sheet is fed (1) and stopped in nip 2. Nip 1 is opened, then a second sheet is fed (2). When the second sheet has passed nip 1, but has not yet reached nip2, nip1 is closed and nip 2 is activated (3). The sheets are transported together, with overlap. Now

the sheets can possibly be stopped, for example to wait for another action to finish (4). While stopped, nip 1 is opened again. Finally the sheets can be transported together (5), after which they may need to be realigned.

Claims

1. Method for inline buffering of sheets in a sheet processing apparatus, comprising the steps of

- feeding a first sheet into a transport nip
- feeding a subsequent sheet overlapping onto the first sheet while the transport nip is engaged with the first sheet, such that the relative velocity of the subsequent sheet with respect to the first sheet is substantially zero such that scraping of the subsequent sheet over the first sheet is minimized.

2. Method as described here above and shown in figures 2 or 3.

3. Apparatus configured to perform the method according to any one of claims 1 or 2.

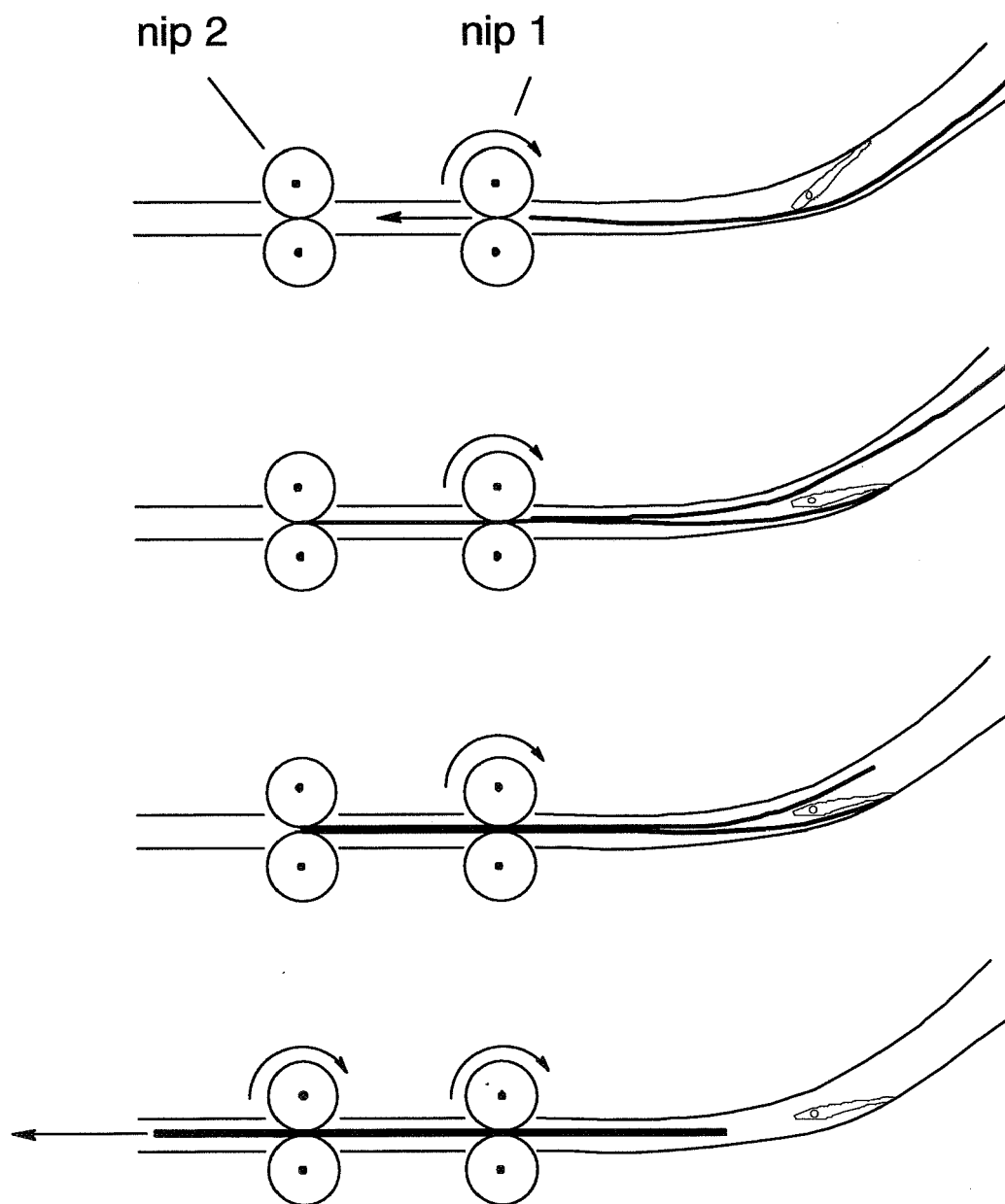


Figure 1: known buffering principle

Fig. 1

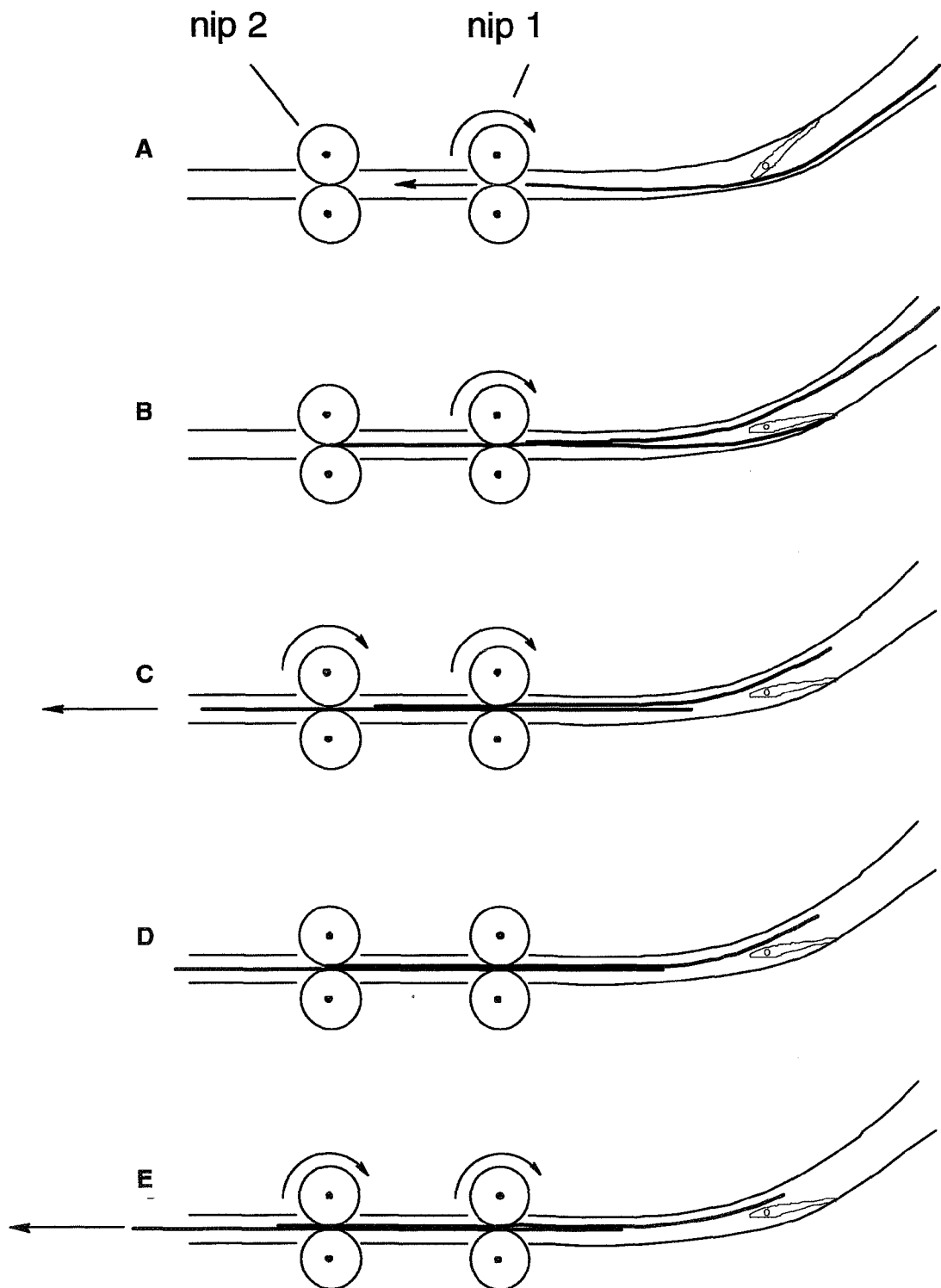


Figure 2: Alternative buffering principle A

Fig. 2

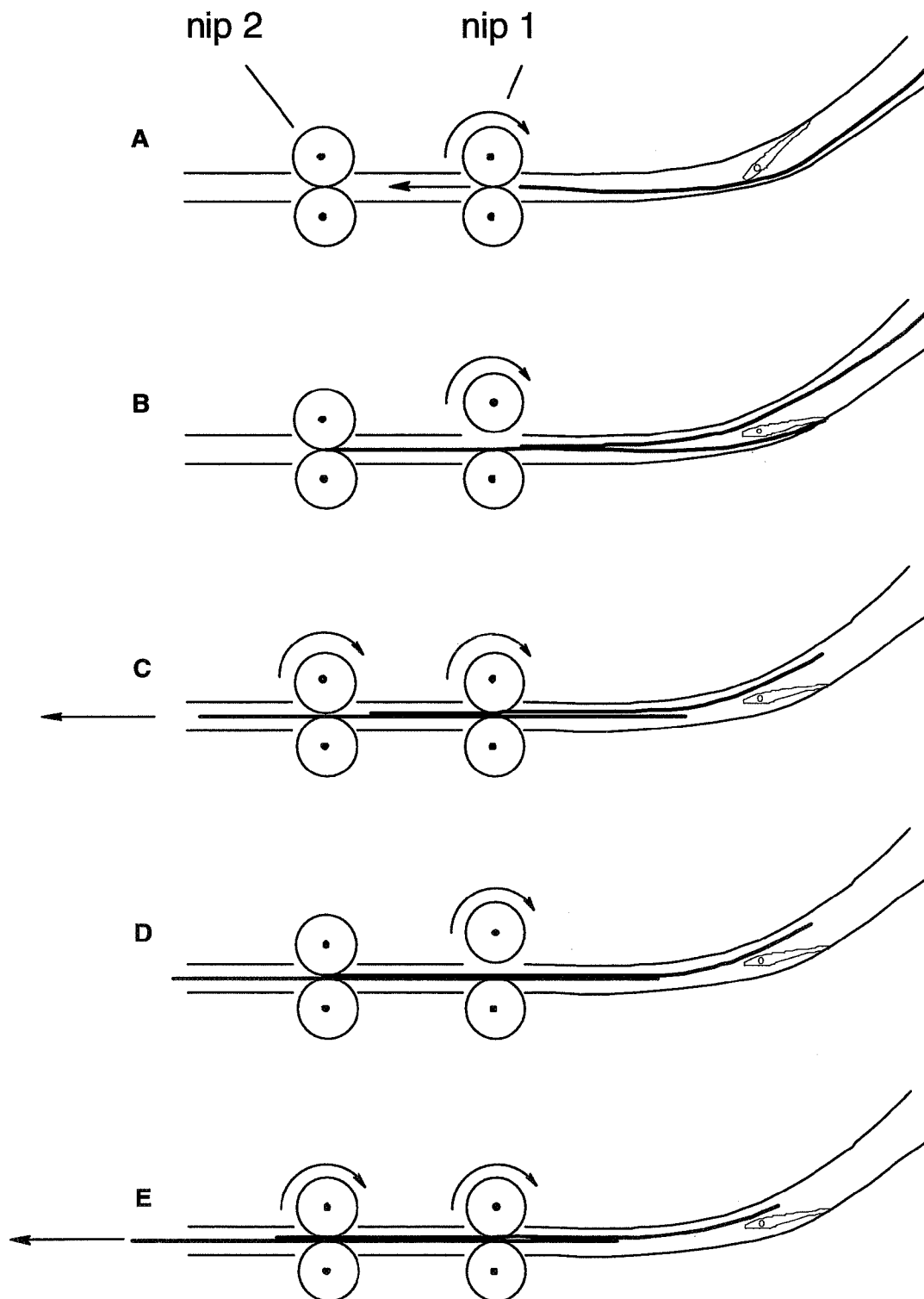


Figure 3: Alternative buffering principle B

Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 08 15 7185

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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 31 October 2008	Examiner Thibaut, Emile
CATEGORY OF CITED DOCUMENTS 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 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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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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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31-10-2008

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