Document Imaging System and Method for Imaging Documents

Reference to Related Applications

[001] The present application claims priority to U.S. Provisional Application No. 63/325,605 filed March 30, 2022, which is hereby incorporated herein by reference. This application is also related to U.S Application No. 18/129,063 filed on March 30, 2023, which is incorporated herein by reference.

Field of Invention

[002] The present invention relates to the field of document processing. The present invention finds particular application to the field of document imaging in which documents are to be fed to an imaging system, such as a document scanner.

Background

[003] Automated and semi-automated machines have been employed for processing documents. There have been numerous improvements in the field of document processing, including scanning and sorting documents, such as incoming mail. However, there remains a desire to improve the handling and processing of documents.

Summary of the Invention

[003a] In an aspect, the present disclosure refers to an apparatus for processing documents, comprising:

a scanner for scanning a packet of documents to obtain image data for each document;

a conveyor for conveying the packet of documents to the scanner, wherein the conveyor is configured to convey the packet in a generally horizontal orientation with a face of the packet facing upwardly;

a feeder configured to feed the documents in the packet from the conveyor to the scanner, wherein the feeder is configured to singulate the documents to serially feed the documents to the scanner; and

a skew reduction assembly upstream from the feeder to impede rotation of the documents around a vertical axis as the feeder feeds the documents.

[003b] In an aspect, the present disclosure refers to a method for processing documents, comprising the steps of:

feeding a document along a document path in a first direction by applying a feeding force to a leading portion of the document at a location spaced from a centerline of the width of the document so that the feeding force tends to create a torque in a first direction;

applying an anti-skew force to a trailing portion of the document while the feeding force is applied to the leading portion of the document, wherein the anti-skew force is opposite the direction of the feeding force and is applied at a location spaced apart from the centerline of the document.

[004] The present system provides a number of improvements in the fields of document processing, including separate inventions in document handling and document scanning. Although each of these improvements are combined into a single system, each of the improvements may be used as a separate invention in a

document processing system.

[005] For instance, according to a first example, a system is provided having a scanner for scanning documents, such as incoming envelopes, to obtain image data for the scanned documents.

[006] According to another example, the system provides a system for processing documents that includes a conveyor for receiving documents, a plurality of output locations configured to receive documents from the conveyor and a sorter for sorting documents to the output locations. Optionally, the conveyor may be configured to convey documents along a document path without entraining the documents.

[007] According to a further example, the system provides an apparatus for processing documents that includes a scanner, a conveyor a feeder for feeding documents from the conveyor to the scanner and a means for reducing skew feeder to impede rotation of the documents around a vertical axis as the feeder feeds the documents. Optionally, means for reducing skew may be positioned upstream from the feeder. Additionally, wherein the feeder may be configured to provide a net forward force on a first side of the document at a point laterally space from a centerline of the document and the means for reducing skew may provide a drag force on the first side of the document in a direction opposite the net forward force and spaced apart from the centerline of the document.

[008] According to another example, the system may provide a method for processing documents that includes the step of feeding a document along a document path in a first direction by applying a feeding force to a leading portion of the document at a location spaced from a centerline of the width of the document so that the feeding force tends to create a torque in a first direction and the step of applying an anti-skew force to a trailing portion of the document while the feeding force is applied to the leading portion of the document, wherein the anti-skew force is opposite the direction of the feeding force and is applied at a location spaced apart from the centerline of

the document.

[009] According to an additional example, the present system provides an apparatus for processing documents that includes means for feeding a plurality of documents toward a document transport a means for sorting documents into one or more output bins. The means for sorting may include a document transport configured to convey the documents at a first speed and a discharge transport configured to convey the documents away from the document transport and toward a first bin of the one or more output bins and to selectively increase the speed of the documents to a second speed and then decrease the speed of the documents to a third speed that is lower than the first or second speeds.

[010] According to yet another example, the system may provide a method for processing documents that includes the steps of feeding a plurality of documents one at the time toward a document transport and sorting the documents into one or more output bins. The step of sorting the documents may include the steps of varying the document speed as the document is discharged. For instance, the document may be sped up prior to being discharged. Additionally, after being sped up, the document may then be slowed down prior to discharge.

[011] While the methods and apparatus are described herein by way of example for several embodiments and illustrative drawings, those skilled in the art will recognize that the inventive methods and apparatus for scanning and processing documents are not limited to the embodiments or drawings described. It should be understood that the drawings and detailed description thereto are not intended to limit embodiments to the particular form disclosed. Any headings used herein are for organizational purposes only and are not meant to limit the scope of the description or the claims. As used herein, the word "may" is used in a permissive sense (i.e.,