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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0189705 A1****Diews**(43) **Pub. Date:****Sep. 1, 2005**(54) **DEVICE FOR ALIGNING SHEETS
DEPOSITED ON A SHEET STACK**(30) **Foreign Application Priority Data**

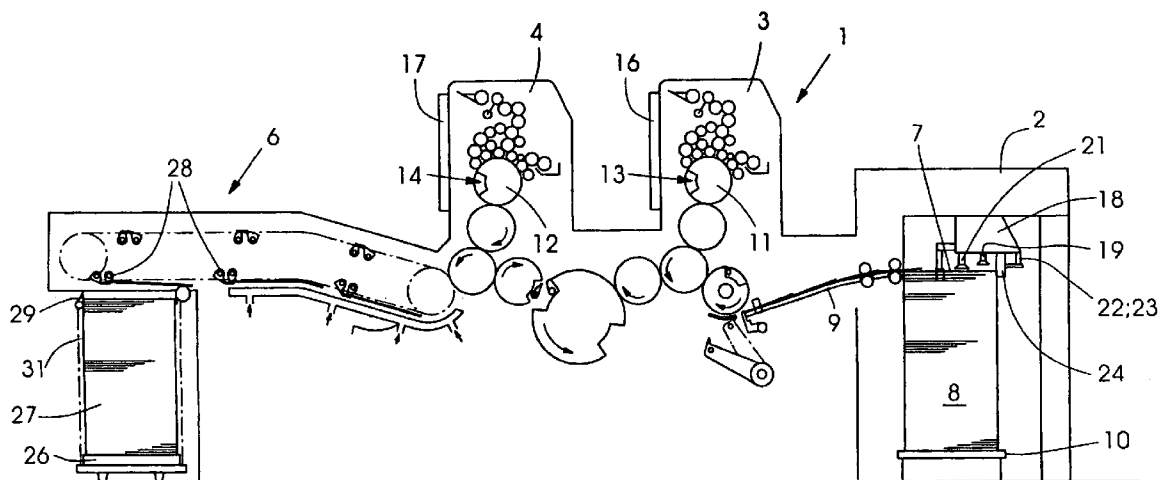
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(75) Inventor: **Michael Diews, Birkenau (DE)****Publication Classification**

Correspondence Address:

LERNER AND GREENBERG, PA**P O BOX 2480****HOLLYWOOD, FL 33022-2480 (US)**(51) **Int. Cl.⁷** **B65H 31/04; B65H 31/12**(52) **U.S. Cl.** **271/218**(57) **ABSTRACT**

A device for aligning sheets in the delivery of a sheet processing machine has leading edge stops that are pivotable about two mutually parallel axes of rotation. The leading edge stops are disposed on a common crossmember, and they can be selectively pivoted downward about one pivot axis or upward about the other pivot axis as desired.

(73) Assignee: **Heidelberger Druckmaschinen AG**(21) Appl. No.: **11/057,632**(22) Filed: **Feb. 14, 2005**

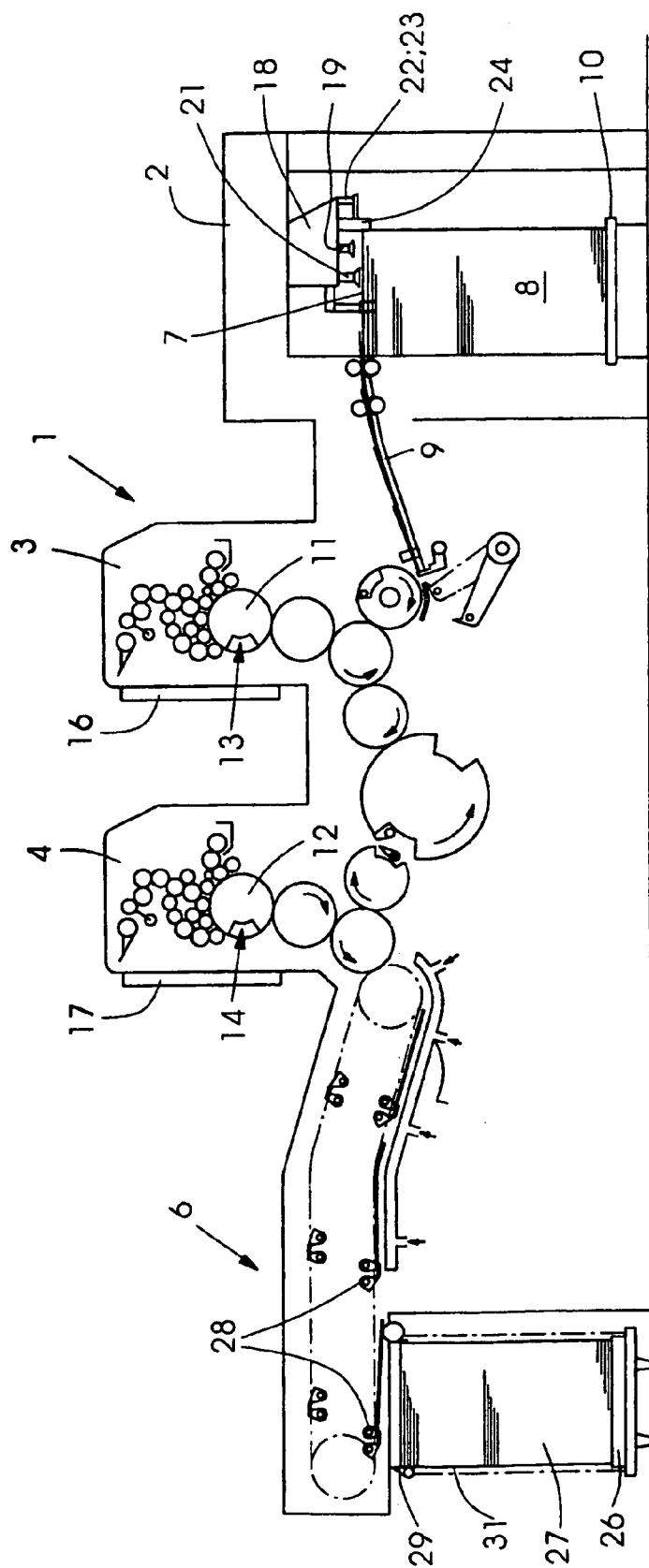


Fig. 1

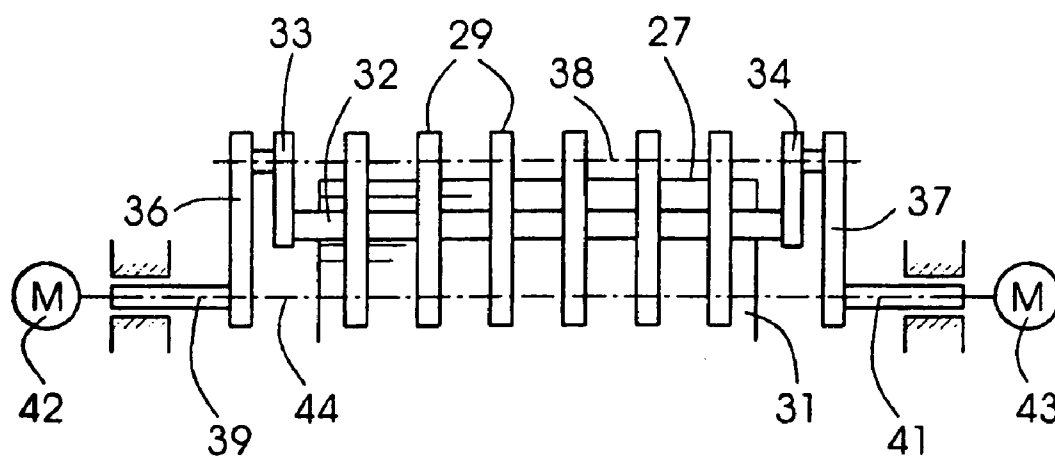


Fig.2

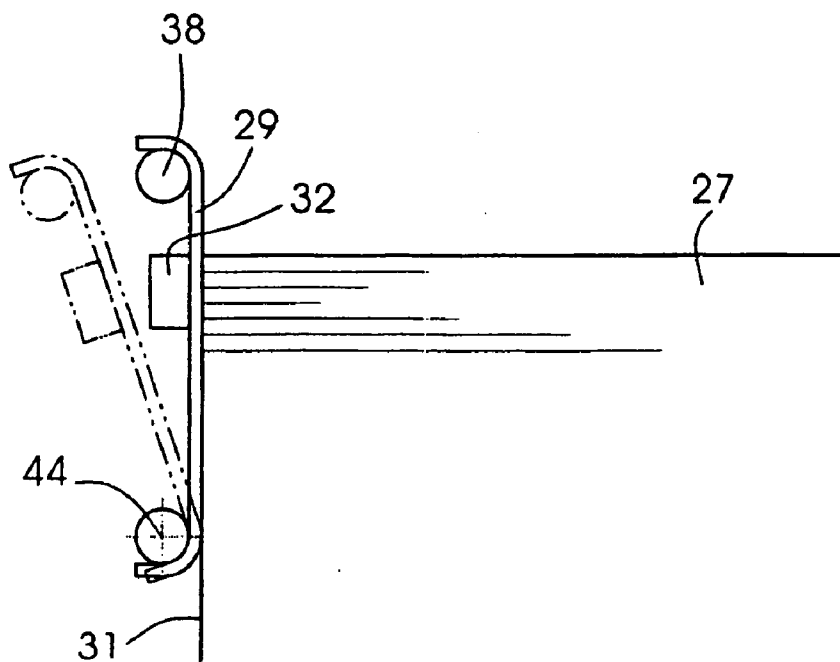


Fig.3

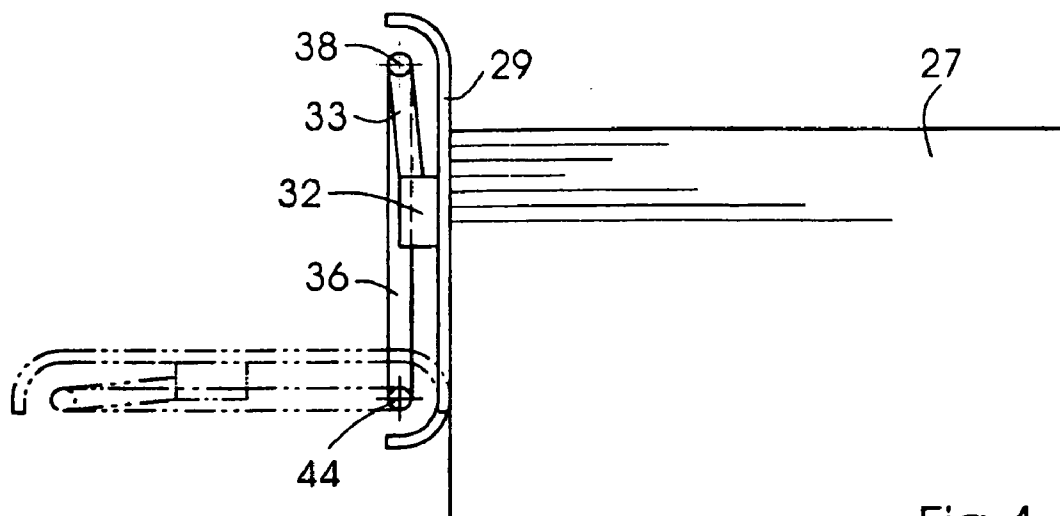


Fig.4

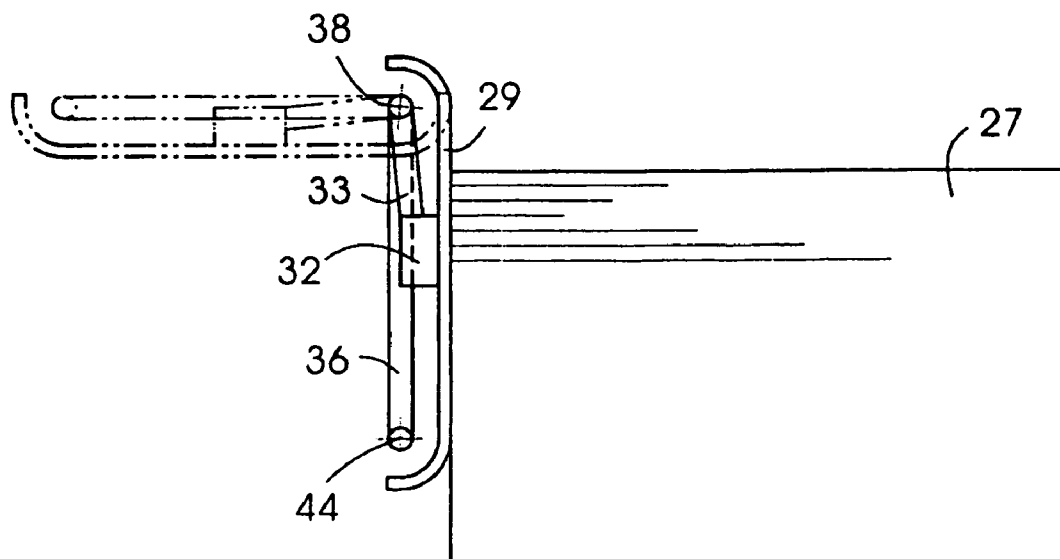


Fig.5

DEVICE FOR ALIGNING SHEETS DEPOSITED ON A SHEET STACK

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention lies in the field of sheet processing machines.

[0003] In the delivery of sheet processing machines, it is known to provide leading edge stops for the sheets to be deposited on a stack. The sheets conveyed to the stack strike the leading edge stops and are then laid exactly on the sheet stack.

[0004] Here, substantially two types of leading edge stop mountings are known: the first has an upper bearing point, from which the leading edge stop extends downward, the latter being mounted such that it can be pivoted away from the stack. A leading edge stop of the first type is disclosed, for example, German published patent application DE 101 52 844 A1. It is thereby advantageous that, after the stop has been pivoted away, auxiliary stacking devices, such as hurdles or rakes, can easily be pushed in counter to the arriving sheet or arriving sheet stream. However, one disadvantage is that the bearing shaft located at the top for the individual leading edge stops hampers the removal of proofs.

[0005] By contrast, German published patent application DE 34 23 265 A1 shows a leading edge stop with a leading edge stop shaft located at the bottom. This has the advantage that leading edge stops arranged such that they can be pivoted away permit the easy removal of proofs, while it is disadvantageous that auxiliary stacking devices, such as hurdles or rakes, for example for non-stop operation, can be pushed in only underneath the leading edge shaft, since the access to the upper stack region is hampered by the leading edge stops and shaft.

SUMMARY OF THE INVENTION

[0006] It is accordingly an object of the invention to provide a device for aligning sheets which overcomes the above-mentioned disadvantages of the heretofore-known devices and methods of this general type and which permits simple removal of proofs and also provides the possibility of introducing auxiliary stacking devices into the stack in the upper stack region.

[0007] With the foregoing and other objects in view there is provided, in accordance with the invention, a device for aligning sheets on a sheet stack, comprising:

[0008] a plurality of leading edge stops mounted for selectively pivoting about an upper pivot axis and about a lower pivot axis, wherein the upper pivot axis and the lower pivot axis are parallel to one another.

[0009] It is an advantage of the invention that the access to the delivery of a sheet processing machine, in particular for activities that are repeated again and again, such as the removal of proofs and the supply of auxiliary stacking devices such as hurdles or rakes, is simplified by the device according to the invention in such a way that easy handling is ensured.

[0010] In particular, as a result of separating the functions of the leading edge stop shaft—the pivot axis of the leading edge stops is located outside the crossmember for connecting a plurality of leading edge stops—it is possible for the leading edge stop assembly to be arranged such that it can be pivoted away downward or upward as desired. Arranging two independent axes of rotation for the leading edge stop thus permits the leading edge stop to be pivoted away upward for the supply of auxiliary stacking devices and likewise downward for the removal of proofs.

[0011] In an advantageous development, the leading edge stop shaft is equipped with a pivoting device that can be driven periodically and moves the leading edge stops at the cycle rate of the incoming sheets, in order to optimize the forming of a stack.

[0012] In accordance with an added feature of the invention, the leading edge stops are arranged on a common crossmember, and the stops can be pivoted about the upper pivot axis by means of levers arranged on the crossmember. Furthermore, it is preferable if the leading edge stops are arranged such that they can be pivoted about the lower pivot axis by means of couplers.

[0013] In accordance with an additional feature of the invention, a drive device is arranged on the lower axis of rotation in order to pivot the leading edge stops cyclically.

[0014] In accordance with a concomitant feature of the invention, the device can be employed in the delivery of a sheet processing machine, in particular in a printing press.

[0015] Other features which are considered as characteristic for the invention are set forth in the appended claims.

[0016] Although the invention is illustrated and described herein as embodied in a device for aligning sheets deposited on a sheet stack, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims.

[0017] The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 is a schematic side view of a sheet-fed printing machine;

[0019] FIG. 2 is a partly diagrammatic view of the device according to the invention from the rear, counter to the sheet transport direction;

[0020] FIG. 3 is a sectional view of the device according to the invention;

[0021] FIG. 4 is a section through the device according to the invention in the vertical position of the leading edge stops; and

[0022] FIG. 5 is a section through the device according to the invention in a position in which the leading edge stops are pivoted away from the sheet stack for removing print samples.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] Referring now to the figures of the drawing in detail and first, particularly, to **FIG. 1** thereof, there is shown a sheet-processing machine that processes sheets **7**, for example a press **1**. The machine has a feeder **2**, at least one printing unit **3** and **4** and a delivery **6**. The sheets **7** are removed from a sheet stack **8** and, separated or overlapping, are supplied over a feed table **9** to the printing units **3** and **4**. The printing units are conventional printing units each containing a plate cylinder **11**, **12**. The plate cylinders **11** and **12** each have a device **13**, **14** for fixing flexible printing plates. Furthermore, each plate cylinder **11**; **12** is assigned a device **16**; **17** for semiautomatic or fully automatic printing plate change.

[0024] The sheet stack **8** lies on a stack board **10** which can be raised under control. The removal of the sheets **7** takes place from the upper side of the sheet stack **8** by means of a so-called suction head **18** which, inter alia, has a number of lifting and dragging suckers **19**, **21** for separating the sheets **7**. Blowers or blowing devices **22** are provided for loosening the upper layers of sheets, and sensing elements **23** for stack tracking. In order to align the sheet stack **8**, in particular the upper sheets **7** of the sheet stack **8**, a number of lateral and rear stops **24** are provided.

[0025] The delivery **6** has, inter alia, a main stack board **26** to accommodate a sheet stack **27**. The sheets **7** are supplied to the sheet stack **27** by means of a chain gripper system **28**. Leading edge stops **29** are arranged in the upper stack region at the stack leading edge **31** and assist the exact formation of a stack.

[0026] Referring now to **FIG. 2**, a plurality of mutually spaced-apart leading edge stops **29**, also referred to as front lays **28**, are disposed on a common crossmember **32**, distributed over the sheet width (format width) to be processed. At its ends, the crossmember **32** in each case has a lever **33**; **34** which, at its free end, is connected in an articulated manner to a coupler **36** or **37**, respectively. The two hinge points arranged laterally behind the sheet stack **27** have a common upper pivot axis **38**. At an end facing away from the hinge point, the coupler **36**; **37** is in each case fixed to an output shaft **39**; **41** of an electric motor **42**; **43**. The output shafts **39**; **41** have a common lower pivot axis **44**.

[0027] The electric motor **42**; **43** sets the leading edge stops **29**, as illustrated in **FIG. 3**, into a periodically repeating small pivoting movement about the lower pivot axis **44**. This is preferably carried out at the cycle rate of the sheet processing machine and ensures exact deposition of sheets on the sheet stack **27**.

[0028] The pivoting movement is in this case produced, for example, by reversing the direction of rotation of the motor or by means of a gear mechanism, for example including a cam-roller mechanism.

[0029] The leading edge stops **29** can be pivoted about the upper pivot axis **38** or about the lower pivot axis **44** from a vertical alignment into a horizontal position as desired. The upper pivot axis **38** is preferably arranged at the level of the stack upper edge or above the latter.

[0030] A movement pivoting the leading edge stops **29** away from the sheet stack **27** upward, as illustrated in **FIG. 5**, about the pivot axis **38** thus enables access to the entire sheet stack **27**. Auxiliary stacking devices such as hurdles or rakes can thus be introduced into the stack region at any desired position.

[0031] A movement pivoting the leading edge stops **29** away from the sheet stack **27** downward, as illustrated in **FIG. 4**, about the lower pivot axis **44** enables access to the upper sheet stack region, so that, for example, simple removal of proofs is made possible.

[0032] This application claims the priority, under 35 U.S.C. § 119, of German patent application No. 10 2004 007 067.9, filed Feb. 13, 2004; the entire disclosure of the prior application is herewith incorporated by reference.

I claim:

1. A device for aligning sheets on a sheet stack, comprising:

a plurality of leading edge stops mounted for selectively pivoting about an upper pivot axis and about a lower pivot axis, wherein said upper pivot axis and said lower pivot axis are parallel to one another.

2. The device according to claim 1, which comprises a crossmember and levers mounted to said crossmember, and wherein said leading edge stops are commonly disposed on said crossmember and pivoted about said upper pivot axis by way of said levers.

3. The device according to claim 2, which comprises couplers configured to enable said leading edge stops to be pivoted about said lower pivot axis.

4. The device according to claim 1, which comprises a drive device disposed at said lower pivot axis for cyclically pivoting said leading edge stops.

5. The device according to claim 1, configured for aligning sheets in a delivery of a sheet processing machine.

6. In combination with a printing press, the device according to claim 1 configured for aligning sheets in a delivery of the press.

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