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(71) Applicant: **Xerox Corporation**
Rochester, New York 14644 (US)

(72) Inventors:
- **Savini, David G.**
  Fairport, NY 14450 (US)
- **McEwen, David J.**
  Palmyra, NY 14522 (US)
- **Kingsland, David O.**
  Rochester, New York 14610 (US)
- **Berl, Jeffrey**
  Penfield, New York 14526 (US)
- **Phillips, Scott J.**
  Henrietta, NY 14586 (US)

(74) Representative: **Skone James, Robert Edmund**
GILL JENNINGS & EVERY
Broadgate House
7 Eldon Street
London EC2M 7LH (GB)

(54) A sealed chamber to control the environmental condition of printer media

(57) A tray for holding a media roll being fed to a paper path of a copier/printer including a plurality of wall defining a chamber (105), the chamber including: an open portion thereof for receiving the print media roll (14C); a cover (110) for opening and closing the open portion of the chamber, a first seal (112) associated with the chamber and cover, for preventing air from exiting or entering when the cover is closed, a sheet slot defined in one of the plurality of walls, for feeding print media therethrough to the paper path of the copier/printer; and a second seal, associated with the sheet slot, for preventing air from exiting or entering the chamber as roll media is fed.

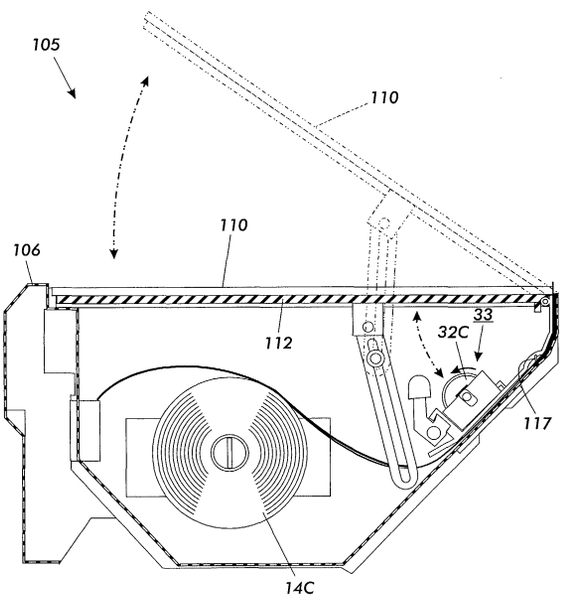

FIG. 3

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Description

[0001] This invention relates to a copier/printer employing a roll media feed apparatus and, more particularly, to a sealed chamber for holding roll media for use with such an apparatus.

[0002] Copying relatively large size documents such as engineering drawings and the like normally requires that the copy, media material be supplied from a roll assembly. As a result, it is necessary that the media material be cut to size from the roll being used, and for this purpose, a cut media roll supply is desirable. Typically, a cut, media roll supply of the type referred to herein includes a roll support which holds and permits the roll to be unwound as sheets are cut therefrom, and a sheet cutter such as a rotary cutter which cuts or severs the sheet material in two. Also conventional is a handling apparatus for unwinding the media material from the supply roll and advancing a length selected to the sheet cutter, and a machine control system for integrating and synchronizing operation of the various components. It is also desirable that the sheet cutter be able to cut, with the utmost reliability and accuracy, a wide range of media materials such as bond, vellum, film, tracing paper, and the like in addition to a wide range of paper weights.

[0003] However, major problems with roll media feeders include ensuring that the roll media has not changed dimension while in machine which results in increase print curl of resultant copies and increases chances of jamming. Printer media should be stored in an environment with a relative humidity of 35% to 55%. Humidity conditions outside of this range can cause poor quality printing and paper distortion. Most printers require external conditioning of the ambient environment (either humidification or dehumidification) to maintain the printing media at proper humidity conditions. Some printers incorporate heating elements to raise the temperature of the air in the media chamber and reduce the relative humidity.

[0004] Accordingly, the present invention provides a tray for holding a media roll being fed to a paper path of a copier/printer including a chamber including: an open portion thereof for receiving the print media roll; a cover for opening and closing said open portion of said chamber, a first seal associated with said chamber and cover, for preventing air from exiting or entering when said cover closed, a sheet slot defined in one of said plurality of wall, for feeding print media therethrough to the paper path of the copier printer; and a second seal, associated with said sheet slot, for preventing air from exiting or entering said chamber as roll media is fed.

[0005] An example of a copier/printer including a tray according to the present invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is an isometric view of a copier/printer;
Figure 2 is a partial, exploded, schematic side view of the copier/printer of Figure 1 showing the placement of dual use sensors; and,
Figure 3 Illustrates an isometric view of a sealed media chamber.

[0006] Referring now to the drawings in detail wherein like numbers represent like elements, in Figure 1 a wide format copier/printer 10 including a control panel 12 is shown which is especially adapted to copy large documents. Documents to be copied are fed in from the front of the machine, pass through an exposure zone and exit out of the back of the machine.

[0007] Figure 2 shows a side internal view of the copier/printer machine 10. Machine 10 includes an electrostatic drum 20 with xerographic stations arranged around its periphery, which carry out the operational steps of the copying process. These stations include charging station 22, exposure station 24, developing station 26, transfer station 28 and fusing station 30. Documents fed along the platen 19 in the direction of arrow 8 are imaged onto the surface of drum 20, at exposure station 24. The operations of the stations are conventional and are described, for example, in U.S. Pat. Nos. 4,821,974; 4,996,556; and 5,040,777.

[0008] Copy media, which may be bond paper, vellum, or the like, is cut from the selected media roll assembly 14A, 14B or 14C and is fed by a respective feed roller pair 32A, 32B or 32C. The sheet to be cut is guided along a vertical path between baffle pairs into the sheet cutting bar assembly 16 which includes a stationary blade 42 and a rotating cutting bar 44 that includes a helical cutting blade. Cutter bar 44 is shown in the home position which is about 30 degrees of rotation away from the cutting position and is driven by motor 60. Cutter assembly 16 is of the type described, for example, in U. S. Pat. No. 4,058,037, referenced supra. Initiated by a cutter operation signal, bar 44 rotates in the direction of the arrow with its blade moving against blade 42 to sheer a sheet 50 from the roll media with a straight cut.

[0009] The cut sheet is transported after registration by roller pair 51 into baffle 52 and then into transfer station 28 where a developed image is transferred onto the sheet. The cut sheet is then forwarded through transfer station 30 and out of the machine.

[0010] In order to cut machine cost, maintain control of the media and monitor the media from initialization to the registration roll pair, three reflective media sensors (33A, 33B, and 33C) are employed in the paper path leading to registration roll pair 51. The sensors are configured to provide a dual function. The first function of the sensors is to initialize the media to a predetermined nominal position, for example, if a new roll 14C of media is loaded into machine 10, the media lead edge is indexed into a nominal feed start position once the operator loads the media feed edge into pinch roll pair 32C. That is, after the machine doors are closed, sensor 33C is adapted to sense the lead edge of the media. If the lead edge is not detected, the media is automatically fed forward toward media sensor 33C by pinch roll pair 32C

until the lead edge is detected by sensor 33C, pinch roll pair 32C is reversed by a conventional media rewind drive (not shown) for a preset time interval with the media lead edge being placed in a predetermined nominal position as shown. If media sensor 33C initially detects the lead edge of the media after the operator loads the media into the machine, pinch roll pair 32C reverses until the media lead edge uncovers the sensor and continues to rewind to the nominal position between pinch roll 32C and sensor 33C. The media initialization procedure is the same when loading media rolls 32B and 32A. A second function of sensors 33A, 33B and 33C is to monitor progress of media through the machine's predetermined paper path during each feed cycle. The sensors 33A, 33B and 33C monitor the lead edge of the media as it is fed vertically up the media path until the lead edge of each cut sheet reaches registration sensor 35. For example, when an operator selects media roll 14C on control panel 12 and a copying cycle is initiated by the machine's conventional microprocessor controller, pinch roll pair 32C is energized and the media begins to feed toward sensor 33C.

[0011] The media lead edge will be detected by sensor 33C within a predetermined window. Each of the three sensors 33A, 33B and 33C have a predetermined time window within which the media lead edge should be detected as it progresses toward registration sensor 35. If any of the three media sensors do not detect the media lead edge within the predetermined time interval, a jam is indicated and the machine is stopped automatically for operator interaction.

[0012] Figure 3 illustrates an isometric view of sealed media chamber of the present invention. Lid 110 is hinged along panel chamber 105 which allows the operator to load media into chamber 200. The top 106 of chamber 105 has a seal 112 which prevents air from entering or leaving chamber 105. During media loading, an operator lifts baffle 33 which holds media secured during media feeding. Seal 117 is positioned on upstream from pinch roll pair 32C and prevents air from enter or leaving chamber 105. Seal 117 comprises a thin plastic sheet or blade which urges the media against chamber 105. When copy cycle is ended with media 14C the lead edge of the media is reversed downstream of seal 117.

[0013] Applicants have found that the sealed chamber helps produce higher quality prints over a wide range of environmental conditions. In recapitulation, there has been provided a passive system that will maintain printing media at the proper humidity level regardless of ambient humidity conditions. A sealed enclosure prevents the media from being exposed to ambient humidity conditions, and creates a storage environment in which the humidity is in equilibrium with the media. No active humidity controls are necessary. The media is fed out of the sealed environment and exposed to ambient conditions only during the print cycle.

[0014] The invention consists of an enclosure made from a suitable material such as plastic or sheet metal, with a removable cover that allows access to the printer media. Gaskets and seals or a suitable sealer material such 'Silicone RTV' are used on all removable surfaces and where shafts, mechanisms or wires must pass through the enclosure. During printing the media exits the enclosure through a seal consisting of a very thin plastic sheet that does not impede the motion of the media in the forward or reversible directions.

Claims

1. A tray for holding a media roll being fed to a paper path of a copier/printer, comprising:

a chamber including:

an open portion thereof for receiving the print media roll;
a cover for opening and closing said open portion of said chamber,
a first seal associated with said chamber and cover, for preventing air from exiting or entering when said cover is closed,
a sheet slot defined in a wall of the chamber, for feeding print media therethrough to the paper path of the copier printer; and
a second seal, associated with said sheet slot, for preventing air from exiting or entering said chamber as roll media is fed.

2. The tray according to claim 1, further comprising a media feed roll for feeding roll media to the paper path of the copier printer.

3. The tray according to claim 1 or claim 2, where said second seal comprises a thin blade bias.

4. The tray according to any of the preceding claims, further comprising control means, in communication with said media feed roll, for moving a leading edge of said roll media to a position downstream of said second seal when said tray is disable.

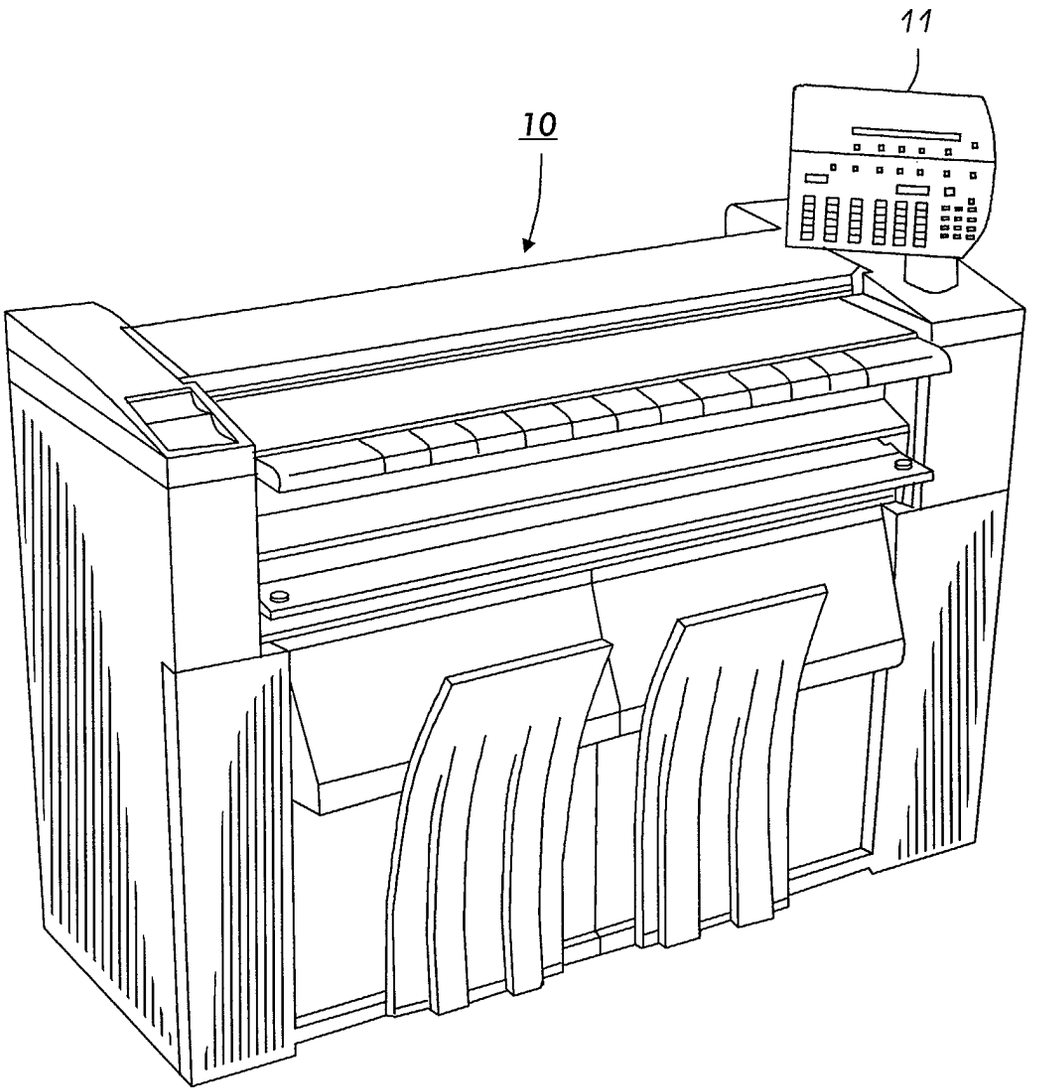
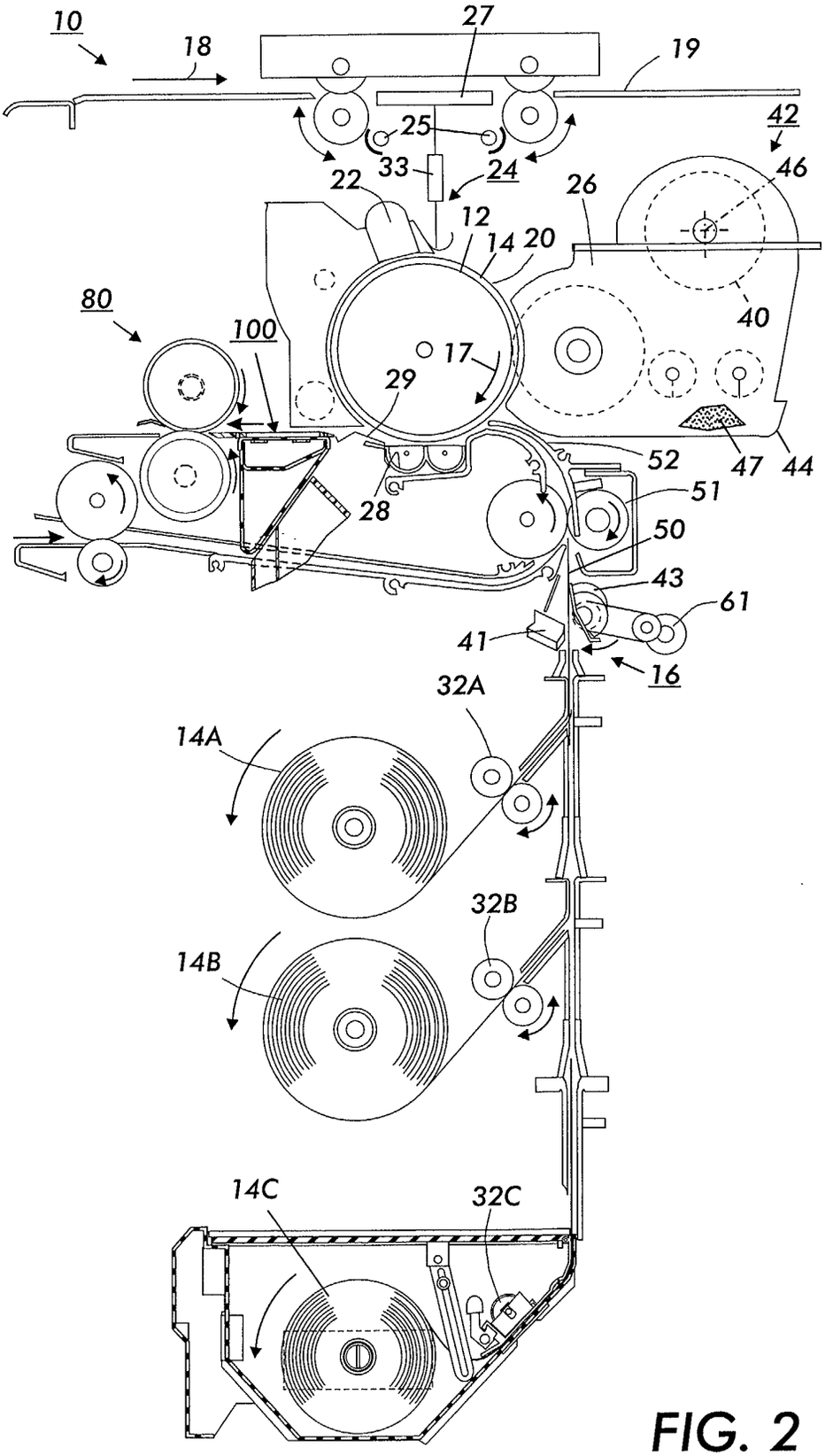


FIG. 1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32C

FIG. 2

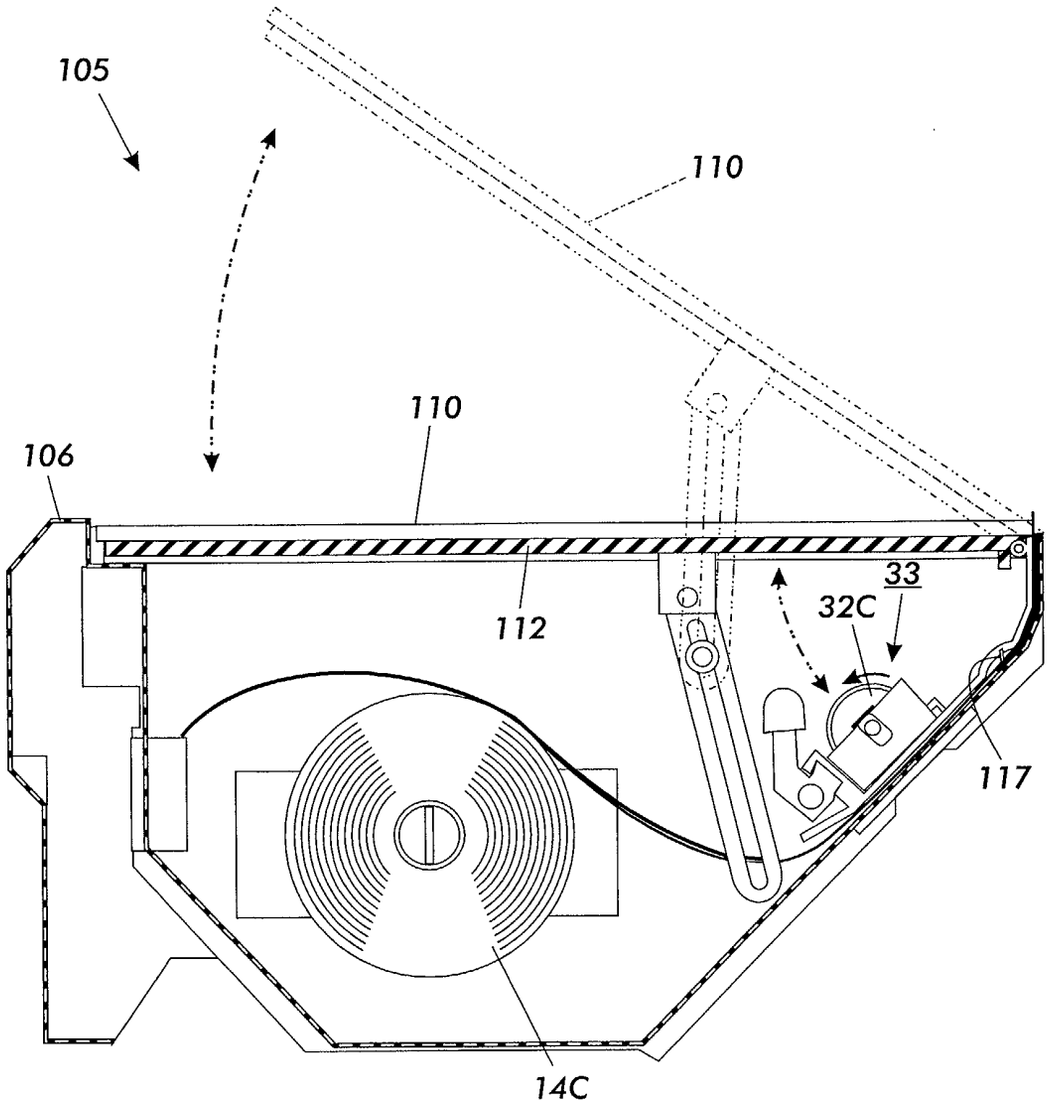

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 02 25 5882

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B41J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	25 November 2002	Axters, M

CATEGORY OF CITED DOCUMENTS

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