(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 923 003 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.06.1999 Bulletin 1999/24

(51) Int Cl.[6]: **G03G 15/00**, B65H 1/04

(21) Application number: **98304627.7**

(22) Date of filing: **11.06.1998**

(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: **12.12.1997 KR 9768325**

(71) Applicant: **Samsung Electronics Co., Ltd.**
Suwon-city, Kyungki-do (KR)

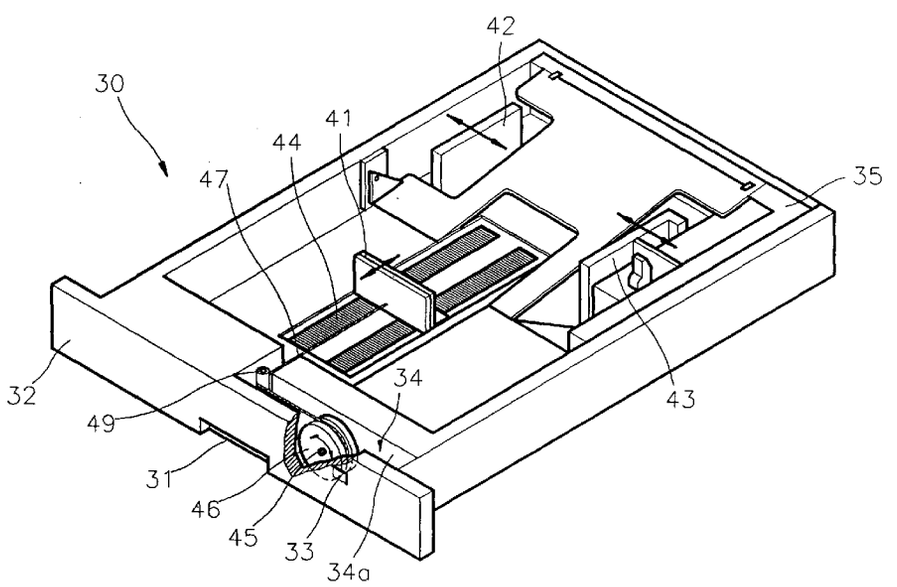
(72) Inventor: **Choi, Sam-seuk**
442-371 Paldal-gu, Suwon-city,Kyungki-do (KR)

(74) Representative: **Chugg, David John**
Appleyard Lees,
15 Clare Road
Halifax, West Yorkshire HX1 2HY (GB)

(54) Display of size of paper stored in printer paper tray

(57) A display of the size of paper stored in a paper tray (30) of a printer is provided. The display includes at least one control plate (41) capable of sliding linearly in a predetermined direction, installed in the paper tray (30) to define the edges of the stored paper, a pulley wheel (46) capable of rotating around one point (45), in one side of the paper tray (30), and linear/rotary movement converting means for converting linear movement of the control plate (41) into corresponding rotary movement of the pulley wheel (46), in which a window (33) is provided in the paper tray (30) to show a portion of the pulley wheel (46), and paper size indicators are displayed in radially-divided regions of the pulley wheel (46) to show the paper size according to the position of the control plate (41). Thus, the size of the paper stored in the paper tray (30) can be seen from the outside, so that the paper tray (30) need not be opened to check the size of the stored paper.

FIG. 2



EP 0 923 003 A2

Description

[0001] The present invention relates to a display of the size of paper stored in a paper tray of a printer, and more particularly, to a display of the size of paper stored in a paper tray of a printer, which allows a user within a visibility range to see the size of paper stored in the paper tray.

[0002] A typical electrophotographic printer such as a laser printer or a copying machine includes a laser scanning apparatus for forming an electrostatic latent image on a photosensitive medium, a developing apparatus for developing the electrostatic latent image, a transfer apparatus for transferring the developed image from the photosensitive medium to a sheet of paper, and a paper tray for storing the paper.

[0003] Referring to Figure 1 showing a typical printer, a paper tray 20 is installed capable of moving into or out of the main body of the printer 10.

[0004] Meanwhile, when the printer 10 is connected to a multitude of personal computers through a network, various sizes of paper may be stored in the paper tray 20. Thus, when one printer is shared by a number of users, a user must check before printing that the printing paper size coincides with the size of the paper stored in the paper tray 20, to suppress printing errors.

[0005] In the conventional art, the paper tray 20 must be ejected from the main body of the printer 10 to check the size of the paper stored therein.

[0006] With a view to solve or reduce the above problem, it is an aim of preferred embodiments of the present invention to provide a display of the size of paper stored in a paper tray of a printer, which allows a user within a visibility range to check the size of the paper stored in the paper tray without ejecting the paper tray from the printer.

[0007] According to an aspect of the present invention, there is provided an apparatus for enabling the size of paper stored internally in a paper tray loaded in a printer to be viewed from the exterior, the apparatus comprising: at least one control member capable of sliding linearly in a predetermined direction, installed in the paper tray to define the edges of the stored paper; rotatable means mounted for rotation about a point; and means for converting linear movement of the control member into corresponding rotary movement of the rotatable means, wherein the printer is provided with a window through which a portion of the rotatable means is visible, and paper size indicators are displayed in radially-divided regions of the rotatable means to show the paper size according to the position of the control member.

[0008] Preferably, the linear/rotary movement converting means includes connection means for connecting the rotatable means to the control member along a predetermined path, and biasing means is provided for supplying restoring force to maintain tension in the connection means with respect to the linear movement of the control member.

[0009] Said connection means preferably comprises a wire and said biasing means comprises a spring for supplying restoring force in a winding direction of said rotatable means.

[0010] The spring is preferably a roll spring obtained by rolling a strip.

[0011] The rotatable means preferably comprises a pulley wheel around which said connection means is arranged to be wound or unwound according to the movement of the control member.

[0012] Said rotatable means is preferably mounted on a side portion of the paper tray.

[0013] Preferably, the window is formed of a transparent material. Said window is provided in said printer tray.

[0014] The invention includes a printer tray incorporating the apparatus of the above aspect and a printer including such a printer tray.

[0015] For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings, in which:

Figure 1 is a perspective view of a typical printer;

Figure 2 is a partially exploded perspective view of a display of the size of paper stored in a paper tray of a printer, according to an embodiment of the present invention;

Figure 3 is a view showing interconnection of a rotary plate of the paper size display and a rotary shaft on the paper tray, through a roll spring; and

Figure 4 is a view showing the rotary plate of Figure 2 on which paper size indicators are displayed.

[0016] Referring to Figure 2, in a paper tray 30, one or more control members such as first control plate 41 capable of linear movement to divide a paper storing space in a first direction, and second control plates 42 and 43 facing each other, capable of linear movement in a second direction perpendicular to the first direction, are provided.

[0017] The first control plate 41 engages with a multitude of guide notches 44 in a row on the bottom surface of the paper tray 30. Also, the second control plates 42 and 43 engage with a multitude of guide notches (not shown) in a row on the bottom surface of the paper tray 30. The distance between adjacent guide notches 44 is the minimum movement distance of the first control plate 41. A window 33 of a predetermined size for showing the inside of the paper tray 30 is provided on one side of the front side 32 of the paper tray 30 having a handle grip 31 for ejecting the paper tray 30. The window 33 may be a hole or formed of a transparent material.

[0018] Rotatable means comprising pulley wheel 46

capable of rotating around a rotary shaft 45 protruding from an inner wall 34a of a groove 34 of the paper tray 30 is provided inside the paper tray 30 behind the window 33.

[0019] As a linear/rotating movement converting means for rotating the pulley wheel 46 with the linear movement of the first control plate 41, there are provided a wire 47 having one end connected to one side of the pulley wheel 46 and the other end connected to the side of the first control plate 41 which faces away from the paper, and a roll spring 48 having its ends connected between the pulley wheel 46 and the rotary shaft 45 on the inner wall 34a, for supplying restoring force with respect to the rotation of the pulley wheel 46 to a predetermined rotation position as shown in Figure 3, to maintain tension in the wire 47 regardless of the position of the first control plate 41.

[0020] The roll spring 48 may be replaced by other resilient biasing means such as a rubber band.

[0021] The restoring force of the roll spring 48 must only tension the wire 47, without moving the first control plate 41.

[0022] A roller 49 allows the wire to slide easily.

[0023] According to the display of paper size, when paper size indicators corresponding to the distance between a rear wall 35 of the paper tray 30 and the first control plate 41 are arranged on a region of the pulley wheel 46 facing the window 33 as shown in Figure 4, a user can see paper size indicator which corresponds to the size of paper in the paper tray 30 by control of the first control plate 41.

[0024] The pulley wheel 46 and the window 33 facing thereto may be positioned considering the appearance of the printer and position of the paper tray 30.

[0025] Meanwhile, the display of the paper size can be based on relative movement between the second control plates 42 and 43 and the pulley wheel 46, as well as relative movement between the first control plate 41 and the pulley wheel 46.

[0026] As described above, according to the display of the size of paper stored in the paper tray for the printer the size of the paper stored in the paper tray can be seen from the outside, so that the paper tray need not be opened to check the size of the stored paper.

[0027] The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

[0028] All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

[0029] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0030] The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. Apparatus for enabling the size of paper stored internally in a paper tray (30) loaded in a printer to be viewed from the exterior, the apparatus comprising:

   at least one control member (41) capable of sliding linearly in a predetermined direction, installed in the paper tray (30) to define the edges of the stored paper;

   rotatable means (46) mounted for rotation about a point (45); and

   means for converting linear movement of the control member (41) into corresponding rotary movement of the rotatable means (46),

   wherein the printer is provided with a window (33) through which a portion of the rotatable means (46) is visible, and paper size indicators are displayed in radially-divided regions of the rotatable means (46) to show the paper size according to the position of the control member (41).

2. The apparatus of claim 1, wherein the linear/rotary movement converting means includes connection means (47) for connecting the rotatable means (46) to the control member (41) along a predetermined path, and biasing means (48) is provided for supplying restoring force to maintain tension in the connection means (47) with respect to the linear movement of the control member (41).

3. The apparatus of claim 2, wherein said connection means comprises a wire (47) and said biasing means (48) comprises a spring for supplying restoring force in a winding direction of said rotatable means (46).

4. The apparatus of claim 3, wherein the spring is a roll spring obtained by rolling a strip.

5. The apparatus of any of claims 2, 3 or 4, wherein the rotatable means (46) comprises a pulley wheel around which said connection means (47) is arranged to be wound or unwound according to the movement of the control member (41).

6. The apparatus of any preceding claim, wherein said rotatable means (46) is mounted on a side portion of the paper tray (30).

7. The apparatus of any preceding claim, wherein the window (33) is formed of a transparent material.

8. The apparatus of any preceding claim, wherein said window (33) is provided in said printer tray (30).

9. A printer tray (30) incorporating the apparatus of any preceding claim.

10. A printer incorporating a printer tray (30) according to claim 9 or incorporating apparatus according to any preceding claim.

FIG. 1

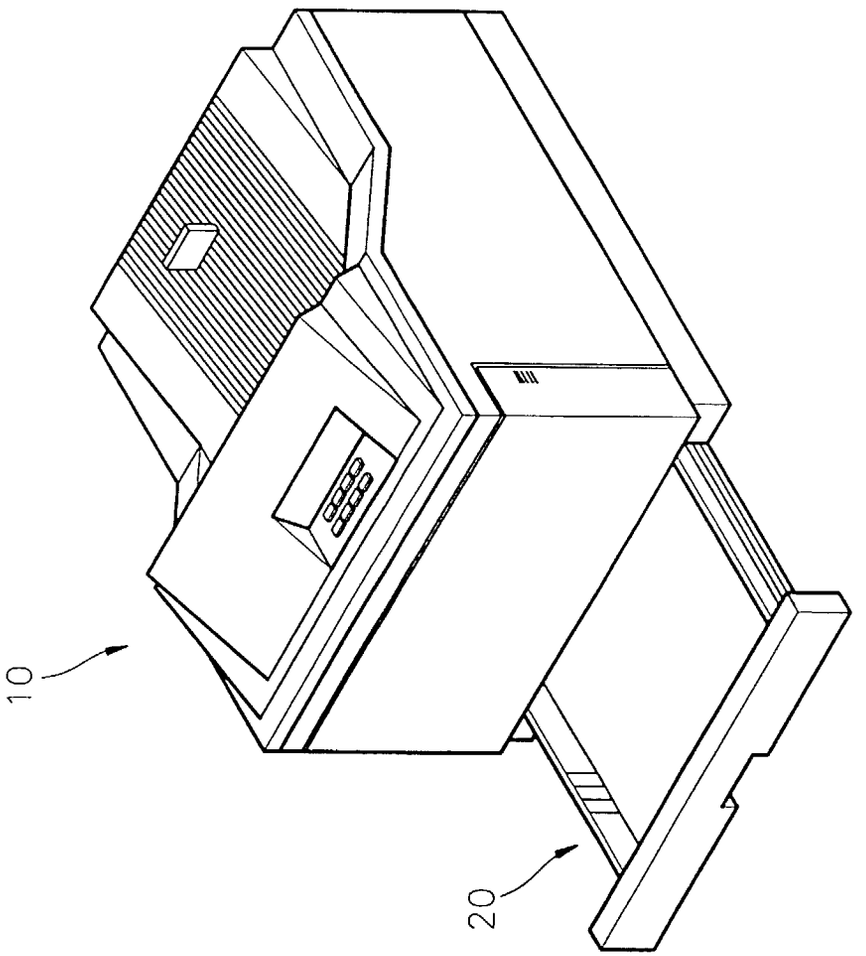


FIG. 2

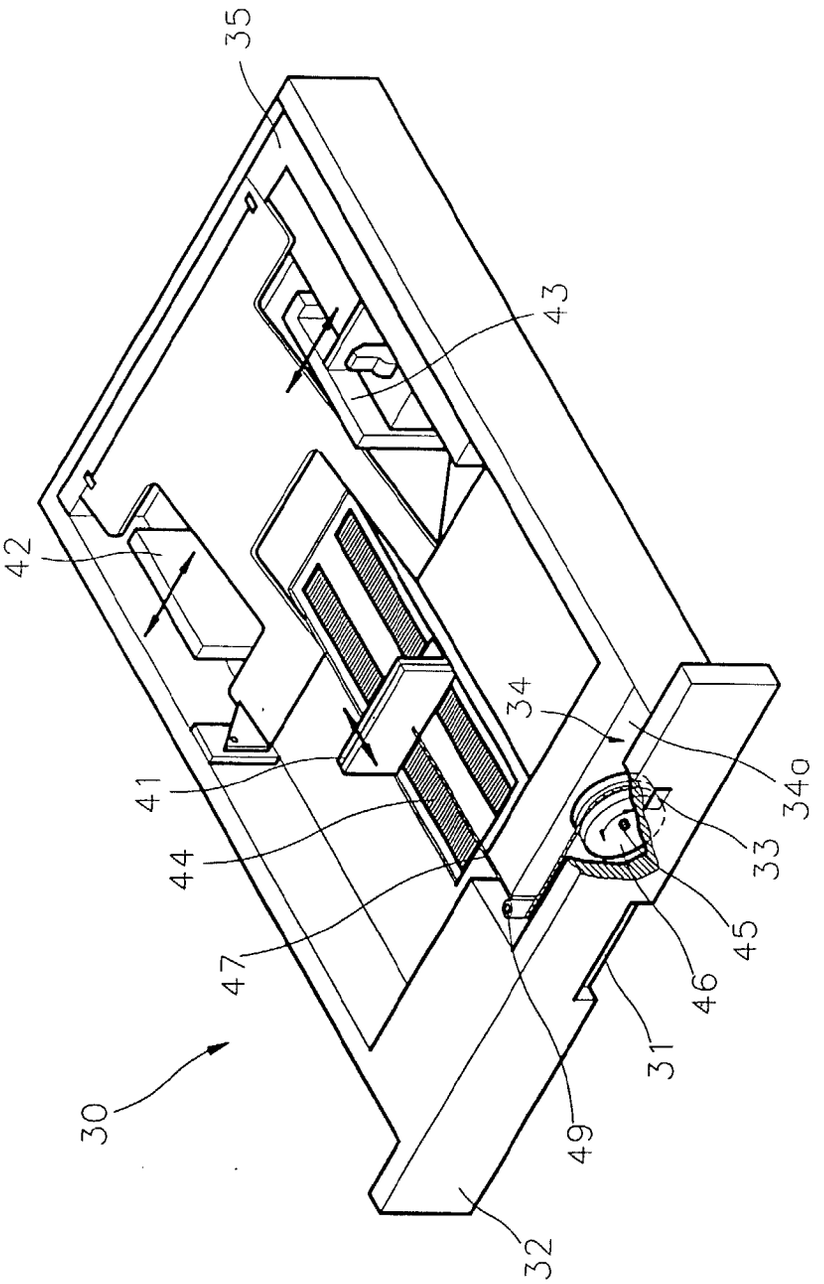


FIG. 3

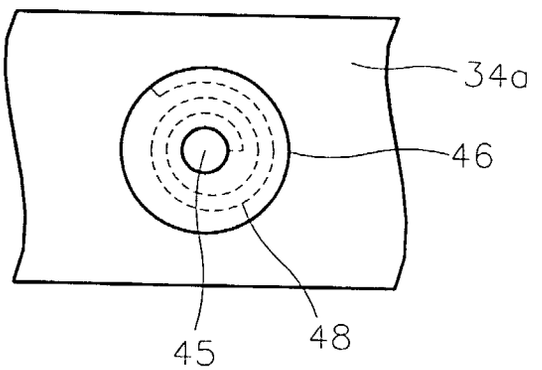


FIG. 4