

Dec. 15, 1970

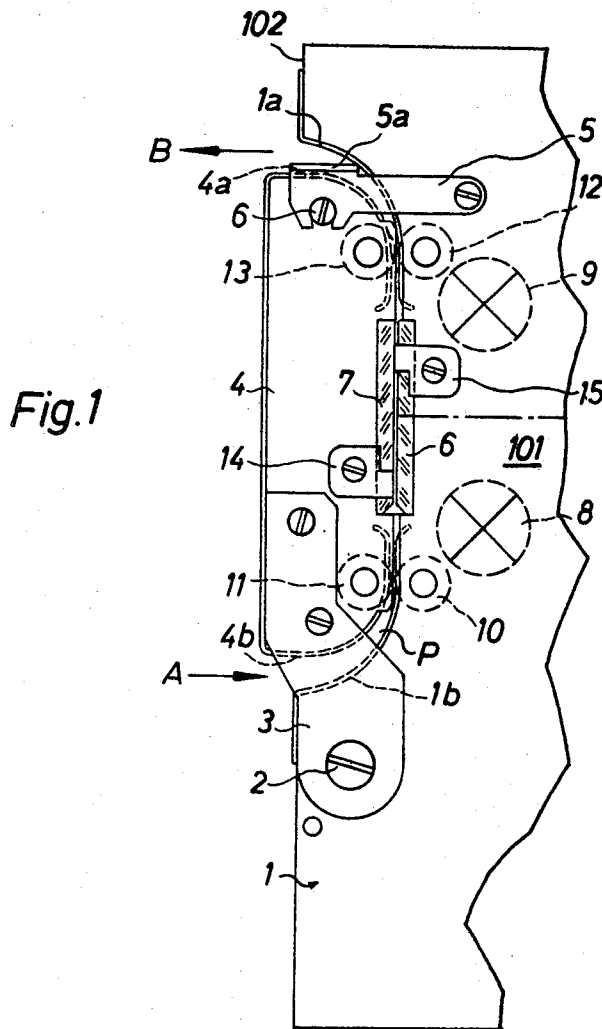
K. PHLEPS ET AL

3,547,536

PROJECTION PRINTING APPARATUS

Filed June 17, 1968

2 Sheets-Sheet 1



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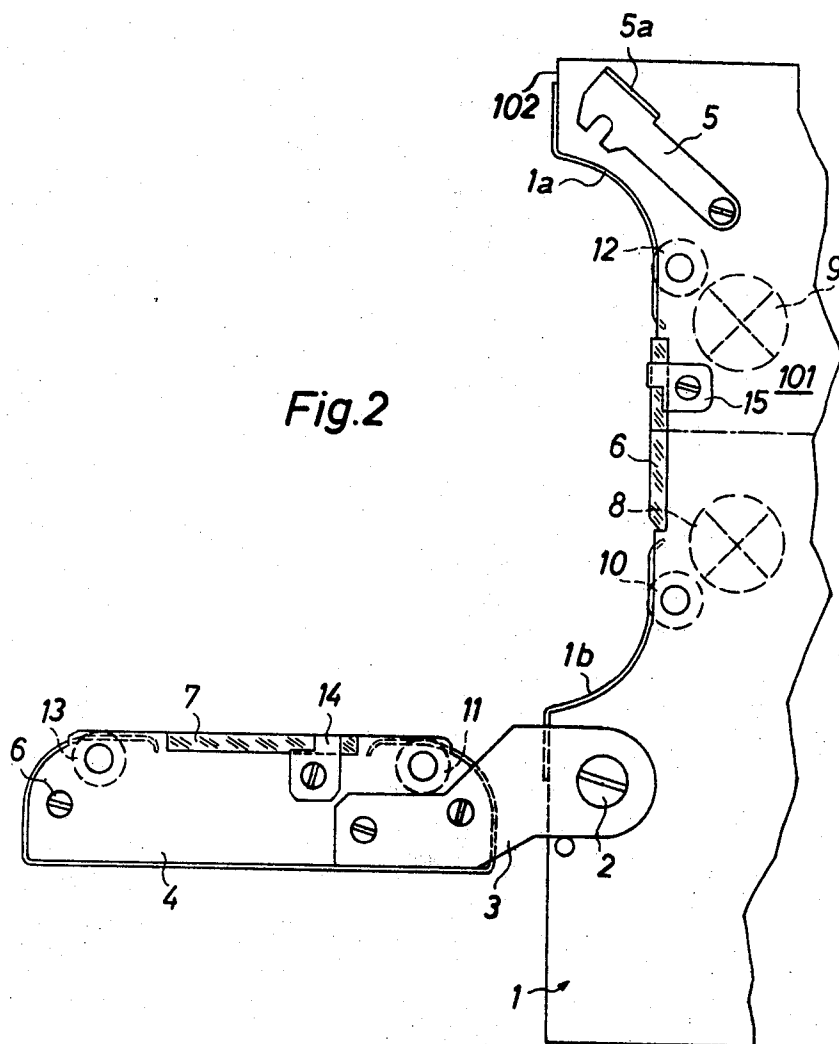
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PROJECTION PRINTING APPARATUS

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Filed June 17, 1968, Ser. No. 737,562

Claims priority, application Germany, June 23, 1967, 1,597,056

Int. Cl. G03b 27/62

U.S. Cl. 355—50

10 Claims

ABSTRACT OF THE DISCLOSURE

A projection printing apparatus wherein the originals are moved in a path defined by two portions of a guide and travel through a gate which is illuminated by printing lamps. One portion of the guide is fixed to or integral with the frame of the printing apparatus and the other portion is hingedly connected with the frame for movement between an operative position and an inoperative position to afford access to an original which is stuck in the guide and to permit inspection and cleaning of the gate. The other portion of the guide has presser rolls or plates which bias the originals against driven transporting rolls in the frame when the other portion is moved to and locked in operative position.

BACKGROUND OF THE INVENTION

The present invention relates to optical printing apparatus in general, and more particularly to improvements in so-called projection printing apparatus of the type wherein images of travelling originals are transferred onto travelling sheets of printing paper or the like.

In projection printing apparatus, the originals are fed into and transported in a path which leads them past a station wherein the images of originals are reflected or focussed onto printing paper. A drawback of presently known projection printing apparatus is that a crimped or otherwise damaged sheet-like carrier is likely to become stuck in the guide which defines the aforementioned path and that removal of such damaged or deformed sheets involves much time and considerable losses in output. Furthermore, overheating in the guide can cause permanent damage to or total destruction of the original, especially if the latter comes to a halt and dwells in close proximity of lamps serving to emit light which is reflected on the original and is directed toward printing paper.

SUMMARY OF THE INVENTION

One of the objects of our present invention is to provide a projection printing apparatus with a novel guide which permits rapid, effortless and convenient removal of damaged or deformed sheets.

Another object of the invention is to provide a simple, inexpensive and compact guide which enables the operator to gain access to sheets which are stuck in the printing apparatus and which also enables the operator to inspect, clean, remove and/or replace such parts which confine the sheets during travel past the optical system.

The improved printing apparatus comprises a frame or housing which accommodates the optical system, the lamps and other essential components as well as a novel guide which comprises two portions one of which is secured to or integral with the frame and the other of which is movable between an operative position in which the two portions define a path of finite length for transport of sheet-like carriers past the optical system and a second or inoperative position in which a carrier which is stuck in the path is readily accessible or is caused to descend

by gravity. In other words, the guide can be opened up or closed at the will of the operator. At the present time, we contemplate to use the improved guide in connection with controlled advance of originals through a projection printing apparatus wherein the originals are caused to travel past one or more lamps to have their images reflected onto travelling sheets or webs of printing paper or the like.

The other portion of the guide may be hingedly connected with the frame and the one portion is preferably provided with a substantially vertical front face into which the inlets and outlets of the path extend when the guide is closed.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved printing apparatus itself, however, both as to its construction and its mode of operation, together with additional features and advantages thereof, will be best understood upon perusal of the following detailed description of the specific embodiment with reference to the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary side elevational view of a printing apparatus which embodies the invention the movable portion of the guide being shown in operative position; and

FIG. 2 is a similar view of the printing apparatus but showing the movable portion of the guide in inoperative position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 illustrates a frame or housing 1 which forms part of a continuous optical printer wherein sheet-like originals are caused to travel in a path P defined by a guide which includes a stationary portion 101 forming part of or rigid with the frame 1 and a second portion here shown as a flap 4 which is movable with reference to the first portion 101 between the operative position of FIG. 1 and a second or inoperative position shown in FIG. 2. The means for releasably locking the flap 4 in operative position comprises a hook 5 which is pivotally secured to the fixed portion 101 and can engage a pin 6 on the flap. The hook 5 has a handgrip portion 5a and can hold the flap 4 in such position that the latter defines with the fixed portion 101 a path of predetermined width. This path P has an inlet A which extends inwardly from an upright front face 102 of the portion 101 and an outlet B which also extends inwardly from the front face 102. It will be noted that the end portions of the path P are of arcuate shape so that an image carrier or original can be admitted by moving in a substantially horizontal plane and that the carrier issues in horizontal position after having passed through the path P.

The fixed portion 101 has arcuate guide plates 1a, 1b which respectively flank the right-hand sides of the outlet B and inlet A and face two similar guide plates 4a, 4b of the flap 4.

A gate along which the carriers travel in the path P comprises a front pane 6 of vitreous or like transparent material which is mounted in the fixed portion 101 substantially midway between the ends of the path P and a rear pane 7 which is mounted in the flap 4. The means for retaining the panes 6, 7 in requisite position includes brackets 15, 14 which are respectively affixed to the portion 101 and flap 4. At least one of these brackets may serve as a means for preventing movement of the flap 4 beyond the operative position. When the flap 4 is moved to or locked in the operative position of FIG. 1, the panes 6, 7 define between themselves a relatively narrow gap for the passage of carriers. The gate including the panes

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6, 7 is analogous to a so-called glass sandwich which is often employed in conventional projection printers. When flap 4 is moved to the inoperative position of FIG. 2, the panes 6, 7 are moved apart so that they are readily accessible for cleaning. Furthermore, a carrier which is stuck in the path P can be readily removed when the flap 4 is moved to and held in the position of FIG. 2. It is clear that the structure shown in FIGS. 1 and 2 may be provided with a different gate, i.e., that the panes 6, 7 can be replaced by other sheet-guiding and confining means, such as foils, tensioned threads or the like. Two fluorescent tubes 8, 9 are mounted in the frame 1 and serve to illuminate the carriers during travel between the panes 6, 7. The images of such carriers are reflected into a suitable optical system which focuses them on a printing paper or analogous sheet-like carrier, not shown.

The means for transporting the carriers in the path P comprises driven transporting rolls 10, 12 which are mounted in the frame 1 adjacent to one side of the path and idler rolls or presser rolls 11, 13 which are mounted in the flap 4 and bear against the carriers to bias them against the peripheral surfaces of transporting rolls. The drive which rotates the rolls 10, 12 is of conventional design and is not shown in the drawing. The rolls 11, 13 can be replaced by plates.

When a carrier becomes stuck somewhere between the inlet A and outlet B, the operator simply detaches the hook 5 from the pin 6 and moves the flap 4 to the inoperative position shown in FIG. 2. The connecting means which secures the flap to the frame 1 comprises two arms 3 (only one shown) on the lower part of the flap and a pintle 2 which is mounted in the frame 1 below the fixed portion 101.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features which fairly constitute essential characteristics of the generic and specific aspects of our contribution to the art, and therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the claims:

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. In a printing apparatus, particularly in a printer wherein the images of travelling first sheet-like carriers are projected onto second sheet-like carriers, a combination comprising a frame; and guide means comprising a first portion provided on said frame and a second portion movable with reference to said first portion between an operative position in which said portions are adjacent to each other and together define an elongated path of finite length for sheet-like carriers and a second position in which the second portion is spaced from said first portion, at least a portion of said path being of arcuate shape and said path having an inlet for admission of carriers and an outlet for evacuation of carriers.

2. A combination as defined in claim 1 wherein said second portion is a flap.

3. In a printing apparatus, particularly in a printer wherein the images of travelling first sheet-like carriers are projected onto second sheet-like carriers, a combination comprising a frame; and guide means comprising a first portion rigid with said frame and having a front face,

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and a second portion movable with reference to said first portion between an operative position in which said portions are adjacent to each other and together define an elongated path of finite length for sheet-like carriers and a second position in which the second portion is spaced from said first portion, said path having an inlet for admission of carriers and an outlet for evacuation of such carriers, said inlet and said outlet extending inwardly from said front face.

4. A combination as defined in claim 3, wherein said front face is located in a substantially vertical plane.

5. A combination as defined in claim 1, further comprising connecting means pivotally securing said second portion to said frame for movement between said operative and second positions.

6. A combination as defined in claim 5, wherein said connecting means comprises a hinge.

7. In a printing apparatus, particularly in a printer wherein the images of travelling first sheet-like carriers are projected onto second sheet-like carriers, a combination comprising a frame; guide means comprising a first portion provided on said frame and a second portion movable with reference to said first portion between an operative position in which said portions are adjacent to each other and together define an elongated path of finite length for sheet-like carriers and a second position in which the second portion is spaced from said first portion; and a gate at least a portion of which is supported by the first portion of said guide means and along which the carriers advance during travel in said path.

8. In a printing apparatus, particularly in a printer wherein the images of travelling first sheet-like carriers are projected onto second sheet-like carriers, a combination comprising a frame; guide means comprising a first portion provided on said frame and a second portion movable with reference to said first portion between an operative position in which said portions are adjacent to each other and together define an elongated path of finite length for sheet-like carriers and a second position in which the second portion is spaced from said first portion; and means for transporting the carriers in said path including at least one driven transporting member mounted in said frame adjacent to one side of said path and at least one presser member mounted in said second portion and located at the other side of said path to bias the carriers against said transporting member in the operative position of said second portion.

9. A combination as defined in claim 8 wherein said transporting member and said presser member are rolls.

10. A combination as defined in claim 1, further comprising means for releasably locking the second portion of said guide means in at least one of said positions.

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U.S. Cl. X.R.

95—14; 352—229; 355—64, 75, 99