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(54) Title: SCISSORS CUTTING DEVICE, IN PARTICULAR FOR SHEETS EXITING FROM A DIGITAL PRINTING MACHINE

(57) Abstract: The invention concerns a scissors cutting device in particular for sheets of a given size exiting a digital printing machine and to be cut into smaller sized sheets. The device proposed comprises a movable blade (11) fixed to a first rectilinear supporting bar (12) associated with a stationary counter blade (13) fixed to a second rectilinear supporting bar (14) and where the supporting bar with the movable blade and the supporting bar with the counter blade are attached to the head of a creasing or punching machine, respectively to a moving part and to a fixed part in place of the movable and fixed creasing or punching tools of the machine itself.
"SCISSORS CUTTING DEVICE, IN PARTICULAR FOR SHEETS EXITING FROM A DIGITAL PRINTING MACHINE"

* * *

Field of Invention

This invention concerns a cutting device for sheets of material such as paper and the like, and refers in particular to a scissors cutting device which can be applied on a machine using single sheet feed to cut digitally printed sheets.

State of the Technique

As regards to cutting devices for paper and the like, there are at present on the market cutters that work on continuous rolls of paper and which is fed using a "track feed drive".

On the other hand, digital printing or "print on demand" has become more and more widely used, even if not exclusively, in the production of advertising material to be sent by post and delivered door to door.

Digital printing makes use of high-tech machines which operate on single sheets and are usually rented. The renting cost is usually calculated on the cost per printed copy using A3 size sheets. However, continuous research into limiting costs has induced the users of digital printing machines to propose forwarding or deliveries of advertising materials on at least A4 size
sheets. In this way it is possible to print double compared to A3 size with a cut in renting cost per copy. Furthermore, each A3 sheet can be cut into two A4 sheets and these, if required can be cut into even smaller sizes.

The type of cutters mentioned above and at present available seems to be unsuitable for handling and cutting separate, single sheets.

**Objectives and Summary of the Invention**

This invention has been conceived based on digital printing market requirements and the possibility of being able to have efficient cutting devices to divide each single A3 size sheet into two A4 size sheets and where required to divide the latter into A5 size sheets or smaller.

It is in fact the objective of this invention to put forward and provide a scissors cutting device able to meet these requirements.

Another objective of the invention is to supply a cutting device devised and configured to be applied on a creasing and punching machine, built to operate on single sheets, in the place of the usual creasing and punching tools.

Yet another objective of the invention is to put forward a machine having its own single sheet feed system and means for receiving and moving a tool in guillotine fashion rather than it being fixed, it being also equipped with a scissors cutter.

A further objective of the invention is to create the conditions to give a usual creasing and punching machine an additional cutting function for dividing the individual sheets.

These objectives and the obvious advantages deriving from them are,
according to the invention, achieved, in the scissors type cutting device which comprises a movable blade fixed to a first supporting rectilinear bar and a stationary counter-blade fixed to a second rectilinear supporting bar and where the mobile blade supporting bar and the supporting bar of the counter-blade are associated respectively with a control unit subject to alternating vertical movements and a fixed unit of a creasing or punching machine.

**Brief Description of the Drawings**

The invention will however be described in more detail with reference to the enclosed indicative and not limiting drawings, in which:

10 Fig. 1 shows, separately, the two mobile and fixed components of the scissors cutting device;

Fig. 2 shows the two components of the cutting device associated as when in use;

Fig. 3 shows an enlargement of a cross section according to arrows A-A in Fig. 2,

Fig. 4 shows a machine equipped with a cutting device according to the invention; and

Fig. 5 shows an enlargement of a part of the machine in Fig. 4.

**Detailed Description of the Invention**

20 As shown, the device in question comprises a movable cutting blade 11 fixed to a first rectilinear supporting bar 12 and a stationary counter-blade 13 fixed to a second rectilinear supporting bar 14.

The first supporting bar 12 has a T cross section with two end lateral wings 15 and a central vertical rib 16. The movable blade 11 rests against and
is fixed to the front face of the vertical rib 16 of said bar 12 and has a sloping cutting edge 11' protruding downwards from said vertical rib.

The second supporting bar 14 has two lateral base wings 17 and, at the top, a longitudinal housing 18 in which is lodged and fixed the counter blade 13. The counter blade 13 has a cutting edge 13' facing towards and made to combine with the cutting edge 11' of the movable blade.

As a preference the counter blade has a quadrilateral cross section so as to have four cutting edges 13' which can be used one after the other in sequence, re-positioning the counter blade as required. Furthermore, the housing 18, the counter blade is lodged and fixed in, is sloping so as to perform the necessary cutting movement with the active cutting edge and be able at the same time to use each cutting edge of the counter blade.

Associated with the mobile cutting blade 11 and the counter blade 13 are also some soft compressible devices 19 and 20 respectively, acting as paper holders when the device is operating. One of said compressible devices 19 is at the bottom end of the vertical rib 16 of the first supporting bar 12 and is behind the mobile blade 11, in line with the counter blade 13. The other compressible device 20 is positioned in an indent 21 in the second supporting bar 14 on the front of the counter blade 13 and in line with the movable blade.

The first supporting bar 13 has two vertical guide pins 22 at its two opposite ends which fit into corresponding holes 23 in the second supporting bar 14 to guide a bar above and complying with the other.

Moreover, the mobile blade 11 can be supplied with an appendix 24 that extends and is guided in a slot 25 provided in the second supporting bar
The cutting device described above can be applied to a machine 26, as shown in Fig.4, which is usually set up and used for creasing and punching the sheets. This machine can also be placed directly in line with a digital printing machine and comprises, as is well known, an entrance area 27 to receive at least the A3 size printed sheets, a feed roll 28 to move each individual sheet towards an operating head 29, a sheet exit area 30 and a control panel to programme and manage the machine functions.

The head 29 of the creasing and punching machine 26 is usually equipped with creasing or punching tools, one of which associated with a fixed device 31 and the other with a carriage 32 and able to move upwards alternately with the fixed one, both oriented crosswise to the forward feed direction of the sheets.

Advantageously, the first bar 12 supporting the mobile blade 11 and the second bar supporting the counter blade 13 are fixed to the head of said machine respectively instead of and in the same way as the creasing and punching tools. In this way, when the machine is operating, the mobile cutting blade 11 is controlled and moves alternating in height with the counter blade 13 which remains stopped. Consequently, each sheet at the start, moved forward by the feed roller, is cut crossways by the cutting device. When the start sheet is A3 size it can be cut crossways forming two A4 size sheets and the latter sheets can be collected and cut crossways into A5 size sheets according to needs.
CLAIMS

1. Scissors cutting device, in particular for sheets with a set size exiting a digital printing machine and to be cut into smaller sizes, characterised in that it comprises a mobile blade (11) fixed to a first rectilinear supporting bar (12) associated with a stationary counter blade (13) fixed to a second supporting rectilinear bar (14), and in that the supporting bar with the mobile blade and the supporting bar with the counter blade are attached respectively to the head of a creasing or punching machine, the first to moving part and the latter to a fixed part instead of the movable and fixed tools of the creasing or punching machine itself.

2. Scissors cutting device according to claim 1, wherein the supporting bar of the movable blade (11, 12) has two lateral head wings and a vertical central rib; the movable blade rests against and is fixed to a front face of said vertical rib and has a cutting edge which is sloping compared with the horizontal and protruding downwards from said vertical rib; the supporting bar of the counter blade (13, 14) has two base lateral wings and at the top a longitudinal housing; and the counter blade is housed and fixed in said housing with a cutting edge facing towards and designed to interact with the cutting edge of said movable blade.

3. Cutting device according to claims 1 and 2, wherein the counter blade (13) has a quadrilateral cross section with four cutting edges (13')
operating one after the other in succession repositioning the counter blade, and wherein the housing where the counter blade is fixed is sloping to form a cutting edge on the active cutting edge side of the counter blade.

4. A cutting device according to any of the previous claims, wherein the moving cutting blade (11) and the counter blade (13) are associated with compressible soft devices (19, 20) which act as paper holders when the device is operating.

5. A cutting device according to any of the previous claims, wherein the supporting bar of the movable blade and the supporting bar of the counter blade have interacting devices to guide one vertically compared to the other.

6. A cutting device according to any of the previous claims, wherein the movable blade (11) has an appendix moving in and guided in slot cut in the supporting bar of the counter blade.

7. A machine for cutting, in particular sheets of a given size exiting from a digital printing machine and to be divided into sheets of a smaller size, and which comprises a feed in area of printed sheets of a given size, a feed roller for each individual sheet moving towards an operating head, a sheet exit area and a control panel to programme and manage the machine functions, characterised by the fact that the operating head has devices to receiving the supporting bar with the movable blade and the supporting bar with the counter blade of the device according to the previous claims.

8. A machine for creasing and punching the sheets of a set size exiting a digital printing machine, comprising a feed in area of printed sheets of a given size, a feed roller for each individual sheet moving towards an operating
head, a sheet exit area and a control panel to programme and manage the machine functions, and where the operating head comprise two mobile and fixed creasing and punching devices, characterised by a cutting device according to claims 1 to 6 to be assembled in the place of said creasing and punching tools.

9. A machine according to claims 7 or 8, characterised by the fact that it can be positioned in line with another digital printing machine using a set sheet size to be cut into sheets of a smaller size.
# INTERNATIONAL SEARCH REPORT

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. B26D1/00 B26D9/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

B26D B41F B41L B65H G03G B42C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<th>Category</th>
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<td>US 2003/036468 A1 (BLANK KURT ET AL) 20 February 2003 (2003-02-20) paragraphs [0014], [0015], [28.29], [0031], [0034] - [0038], [0048], [0050], [0053], [0054], [0058], [0059], [0064] - [0069]; claims 1,2; figures 1-8</td>
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Further documents are listed in the continuation of Box C.

See patent family annex.

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  *P* document published prior to the international filing date but later than the priority date claimed

Date of the actual completion of the international search

31 May 2006

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