

A PRINTER

5 The present invention relates to a printer and particularly, although not exclusively, to a printer for a video.

Attention is drawn to U.K. Patent Application Number 94 05974.8, relating to a printer for a video, which is a divisional application of the present application.

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Conventionally, a printer for a video rotates the printing paper three times while a thermal printing head sequentially sublimes three dyes of Yellow (Y), Magenta (M) and Cyan (C) laid on a three colour ribbon. The amount of the dye sublimed is controlled by the amount of heat generated in the thermal printing head.

20 A conventional printer for a video shown in Figure 1 which is a side elevation thereof comprises a platen drum 52 and a thermal printing head 51 positioned over the platen drum. A colour ribbon 53 having three dyes of Y, M and C and a printing paper 54 are loaded between the head 51 and the platen drum 52. The printing paper 54 is closely fixed on the platen drum 52 by a holder. In use, 25 the paper rotates together with the platen drum, while the thermal printing head 51 generates heat to sequentially sublime the three dyes on the colour ribbon 53, so that the sublimed dyes are adsorbed on the printing paper 54.

30 The reason why the platen drum 52 is rotated three times is to combine the three colours in the same position on the printing paper to obtain full colour printing. Namely, whenever the platen drum 52 makes a rotation, the three colours are sequentially printed with a slight time interval. Then, the printed paper 54 is discharged 35 through the discharging section. Thus, because the platen drum has to be rotated three times in order to complete printing, it takes considerable time to finish printing. Furthermore, the printing positions of the three colours

may be deviated from each other slightly in spite of the constant rotational speed of the platen drum 52, thereby deteriorating the quality of the printed image. Moreover, as the diameter of the cylindrical platen drum should be
5 large enough to wind the printing paper, it may be generally impossible to decrease the volume of the printer.

According to the invention, there is provided a
10 thermal printer comprising a platen surface on which a sheet of paper to be printed upon is received, and a thermal printing head arranged to move over the platen surface along a guide path in the form of a closed loop so as to print an image on the paper.

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The platen surface may be substantially flat. The printer may further comprise retaining means for positively retaining the sheet of paper in position on the platen surface. Said retaining means may be arranged to
20 clamp the paper on the platen surface. Said retaining means may comprise an arm pivotally mounted, at a pivot point disposed adjacent the platen surface, and a clamping member mounted on the arm, the arrangement being such that said arm may be pivoted about said pivot point between a
25 first position wherein said clamping member does not clamp paper on the platen surface and a second position wherein said clamping member does clamp paper on said platen surface. Said clamping member may be pivotally mounted on said arm.

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Said guide path is preferably arranged such that said thermal printing head may be guided to move substantially perpendicularly to said platen surface and arranged to move substantially parallel to said platen surface.

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The invention extends to a video printer comprising a plate-like platen, a pair of paper holders each provided on one end of said platen, a cam having a curved cam surface in the form of a closed loop, a bracket having a
5 cam follower, and a thermal printing head attached to the lower end of said bracket, said head being arranged to be moved up/down and right/left by said cam follower moving along said curved cam surface.

10 Said paper holder may comprise an arm rotated integrally with a shaft, and a pressing plate pivotably attached to an end of said arm through a pivot.

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

Figure 2 is a side elevation of a video printer; and
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Figures 3A and 3B are side elevations of a part of the video printer.

Referring to Figure 2, a plate-like platen 1 has a
25 paper holder 2 on both ends thereof. Over the platen is mounted a cam 4 having a curved cam surface 5, along which a cam follower 6 of a bracket 7 moves. The bracket 7 has a thermal printing head 3 attached to the lower end thereof. The head 3 may move up/down and right/left
30 during a printing operation as the cam follower 6 moves along the curved cam surface 5. The reference numerals 8

and 9 respectively indicate a colour ribbon and printing paper.

In operation, if the printing paper 9 is supplied
5 onto the upper surface of the platen 1, the paper holders
2 are driven by a drive mechanism (not shown) to fix the
paper on the platen 1. More specifically, as shown in
Figure 3A, the paper is supplied onto the platen 1 through
a gap formed between the platen 1 and a pressing plate 10
10 of each respective paper holder 2 which plate 10 is lifted
initially from the platen 1 to allow the paper to enter
the gap. In this position, if a sensor (not shown) senses
the paper supplied onto the platen 1, an arm 12 is rotated
about its pivot 11 to lower the pressing plate 10 to fix
15 the paper 9 onto the platen 1. The pressing plate 10 is
freely pivoted about a pivot 15, on the arm 12, so that
the underside 10' of the plate 10 may be abutted in
parallel to the platen 1, so as to stably fix the paper
onto the platen, as seen in Figure 3B.

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Thereafter, upon receiving a printing signal
from an internal circuit (not shown), the cam follower 6
of the bracket 7 moves along the curved cam surface 5a
from the initial position A, where the thermal printing
25 head is separated from the platen 1, to the position B
and, therefore, the thermal printing head 3 moves
downwardly to press the paper 9 and the colour ribbon 8 on
the platen 1.

30 Subsequently, as the cam follower 6 moves along the
cam surface 5b, the thermal printing head 3 moves
linearly, to print the Y colour onto the paper, until the
cam follower 6 arrives at position C. If the cam follower
6 further moves to the position D, the thermal printing
35 head 3 rises and is thereby separated from the paper 9.

Then, the ribbon 8 is wound around a reel 20 to replace the initial Y colour part with the M colour part of the paper 9.

5 Upon receiving the signal of the M colour part and with the ribbon 8 suitably positioned over the paper 9, the cam follower 6 moves along the cam surface 5c from the position D to the position C and the printing head 3 is again lowered to press the ribbon 8 and the paper 9.
10 Then, the head moves along the cam surface 5b from the position C to the position B whilst generating heat, and, thus, uniformly printing the M colour.

 Upon completing the printing of the M colour, the cam
15 follower 6 moves upwardly along the cam surface 5a to the position A and the thermal printing head 3 again rises and is separated from the paper 9. Thereafter, the colour ribbon 8 is wound around the reel 20 to replace the M colour part with the C colour part for the paper 9. The
20 subsequent operational steps to print the C colour are the same as when printing the Y colour, as described above.

 Thus, the three colours Y, M and C are harmoniously
printed on the paper, so as to complete one printing
25 operation. Finally, the thermal printing head moves linearly from the position D to the position A so as to prepare for the next-printing operation.

 As apparent from the above description, the printer
30 comprises a plate-like platen that may make it possible to reduce the overall height of a printer. Moreover, as the thermal printing head moves back and forth so as to print, the time required for printing may be reduced. Furthermore, as slip of the paper on the platen may be

substantially prevented, a clear printing image may result.

5 The foregoing description shows only a preferred embodiment of the present invention. Various modifications are apparent to those skilled in the art without departing from the scope of the present invention which is only limited by the appended claims. Therefore, the embodiment shown and described is only illustrative,
10 not restrictive.



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CLAIMS

1. A thermal printer comprising a platen surface on which a sheet of paper to be printed upon is received, and
5 a thermal printing head arranged to move over the platen surface along a guide path in the form of a closed loop so as to print an image on the paper.
2. A printer according to Claim 1, the platen surface
10 being substantially flat.
3. A printer according to Claim 1 or Claim 2, the printer further comprising retaining means for positively retaining the sheet of paper in position on the platen
15 surface.
4. A printer according 3, said retaining means being arranged to clamp the paper on the platen surface.
- 20 5. A printer according to Claim 3 or Claim 4, said retaining means comprising an arm pivotally mounted, at a pivot point disposed adjacent the platen surface, and a clamping member mounted on the arm, the arrangement being such that said arm may be pivoted about said pivot point
25 between a first position wherein said clamping member does not clamp paper on the platen surface and a second position wherein said clamping member does clamp paper on said platen surface.
- 30 6. A printer according to Claim 5, wherein said clamping member is pivotally mounted on said arm.
7. A printer according to any of the preceding claims, wherein said guide path is arranged such that said thermal
35 printing head may be guided to move substantially



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perpendicularly to said platen surface and arranged to move substantially parallel to said platen surface.

8. A video printer comprising a plate-like platen, a pair
5 of paper holders each provided on one end of said platen,
a cam having a curved cam surface in the form of a closed
loop, a bracket having a cam follower, and a thermal
printing head attached to the lower end of said bracket,
10 said head being arranged to be moved up/down and
right/left by said cam follower moving along said curved
cam surface.

9. -A video printer as claimed in Claim 8, characterised
in that said paper holder comprises an arm rotated
15 integrally with a shaft, and a pressing plate pivotably
attached to an end of said arm through a pivot.

10. A printer for a video substantially as hereinbefore
described with reference to Figures 2 and 3 of the
20 accompanying diagrammatic drawings.
