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(12) # EUROPEAN PATENT APPLICATION

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(54) **Device for character alignment in a serial printer.**

(57) A serial printer, which uses detent alignment of closely spaced type slugs (11) on a print wheel (1). The detent alignment print hammer (15) is shaped (29) to avoid direct contact with type slugs (11) adjacent the desired type slug. The hammer (15) is shaped to cause the adjacent slugs (11) to be swept aside. Optionally, the character slugs may have tapered sides (31) to assist in the "sweeping" action.

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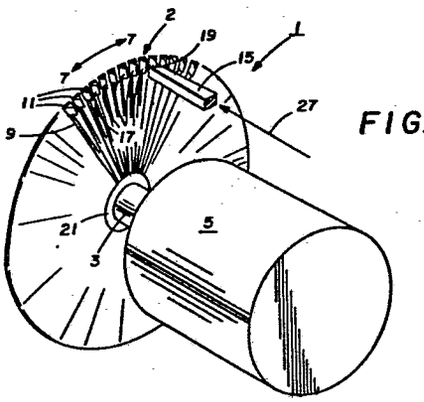

2
7
19
1
7
15
11
27
9
17
21
5
3

FIG. 1

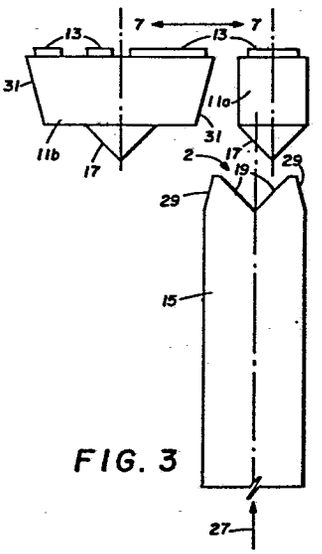

7
7
13
13
31
11a
31
11b
17
17
2
19
29
29
15
27

FIG. 3

Serial printer

The invention relates to serial printers and, more particularly, to high-speed serial printers having print fonts arranged upon a disc member, which rotates the fonts past an impacting printing hammer at a print station generally designated as 2. In such printing systems, it is necessary to accurately position the print head as the print head contacts the print ribbon so that the printed characters will be aligned and spaced evenly. One method for assuring alignment of the print characters is shown in U.S. Patent 3,840,105. In that patent there is disclosed the use of a male shaped surface on the back of the print fonts, which is made to fit into a corresponding shaped female surface on the print hammer. As the print hammer moves into contact with the type font at a print station, the font is forced by the shaped surfaces to align with the print hammer resulting in aligned printed characters. This system is referred to herein as detent alignment. Because of room constraints around the print wheel circumference, character slugs must be placed immediately adjacent to one another, sometimes resulting in as little as several mils separation between adjacent characters. The detent alignment technique, however, requires a fairly wide hammer to ensure capture of the character slug. It can be seen accordingly that the print hammer can strike or at least cause a twisting torque to character slugs or type fonts adjacent the desired font. This is undesirable not only because of the damage the twisting impact can cause the adjacent font support beam, but because of the interference that can occur between the adjacent beam and the desired font support beam causing adjacent character printing and print misalignment.

The invention as claimed is intended to provide

a remedy. It solves the problem of how to design an alignment print hammer for aligning type fonts that will work satisfactorily even when the type fonts are relatively close together. This is accomplished by tapering the sides of the print hammer or type slugs or both. Both is preferable as explained below.

One way of carrying out the invention is described in detail below with reference to the drawings, which illustrate only one specific embodiment, in which:

Figure 1 is a perspective view of the disc print wheel, hammer and motor drive of this invention.

Figure 2 is a top view representation of the prior art detent alignment system showing a print hammer and two character slugs.

Figure 3 is a top view representation of the detent alignment print hammer and two character slugs in accordance with this invention.

The Figures show a serial printing apparatus including a print wheel disc generally designated as 1, a motor 5 for driving the print wheel and a print hammer 15 for striking and aligning the type font or character slugs 11. The print wheel 1 is mounted for rotation on shaft 3 of motor 5. Motor 5 can move wheel 1 in either a clockwise or counterclockwise direction as indicated by arrows 7. Print wheel 1 contains a plurality of outward extending beams or spokes 9 having print heads 11 formed thereon. On one face of print heads 11 are formed characters 13. The face of print heads 11 facing detent alignment hammer 15 is dihedral alignment surface 17 shaped to mate with the dihedral alignment opening 19 in alignment print hammer 15. The beams or spokes are bonded in hub 21, which is fitted to shaft 3 of motor 5.

The prior art hammer and print heads are shown in Figure 2. As seen in Figure 2, the print hammer 15 is roughly aligned with the type slug 11a. It can be seen that as hammer 15 is moved by, for example, a solenoid

towards the type font 11a in direction 27 and engages surface 17, that further movement in direction 27 towards the print ribbon (not shown) will cause hammer 15 to strike edge 28 of print head 11b causing interference with the smooth flight of print head 11a and causing a twisting torque of the beam supporting head 11b and undesirable adjacent character printing.

Referring now to Figure 3, there is seen a detent alignment print hammer 15 and type fonts or character slugs 11a and 11b in accordance with this invention. A portion of the sides of print hammer 15 has been removed to form tapered portion 29. It can be seen that when hammer 15 is moved forward in direction 27, character slug 11b, the adjacent slug, will be swept aside by print hammer taper surface 29 instead of being directly impacted. A further improvement in operation is obtained where the type slugs are also tapered as shown in Figure 3. Here the sides of the larger type slugs represented by slug 11b in Figure 3 are removed to form slanted surface 31. Not only has it been found that by tapering the surface of slugs 11, a greater misalignment between print hammer 15 and type slug 11a can be tolerated, but it has been found that print wheel 1 can be rotated in a direction 7 while the print hammer 15 is in a forward position, which could increase printing speed. Obviously, surfaces 29 and 31 could be made in other shapes, for example, fillet, bevel, flute, etc.

As will be obvious to one skilled in the art, there are many modifications to the invention, which will present themselves. All such modifications as naturally occur to those skilled in the art are deemed to fall within the scope of the attached claims. The illustrative embodiment depicted in the attached drawings is considered merely as an exemplary representation of one of the ways of practicing the invention.

Claims:

1. A serial printer in which character slugs (11) having shaped alignment surfaces (17) are mounted on print wheel (1) and are rotated through a print station (2), and a detent alignment print hammer (15) having a corresponding shaped alignment surface (19) is positioned to strike slugs (11) at the print station (2), characterized in that the print hammer (15) is shaped (29) to cause adjacent character slugs (11) to be swept aside.

2. The serial printer of Claim 1 wherein at least a portion of said character slugs (11) have tapered sides (31).

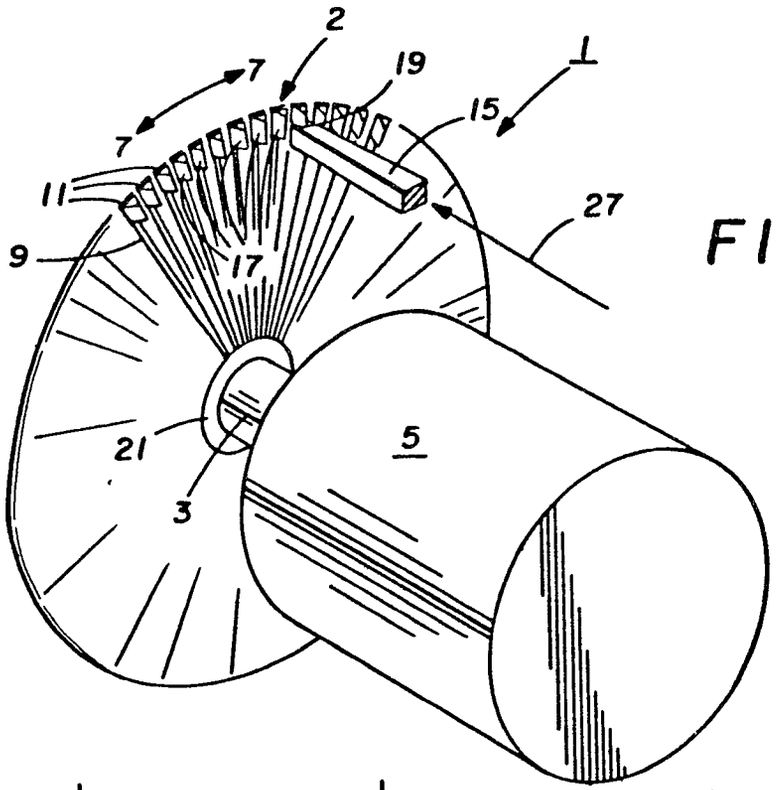


FIG. 1

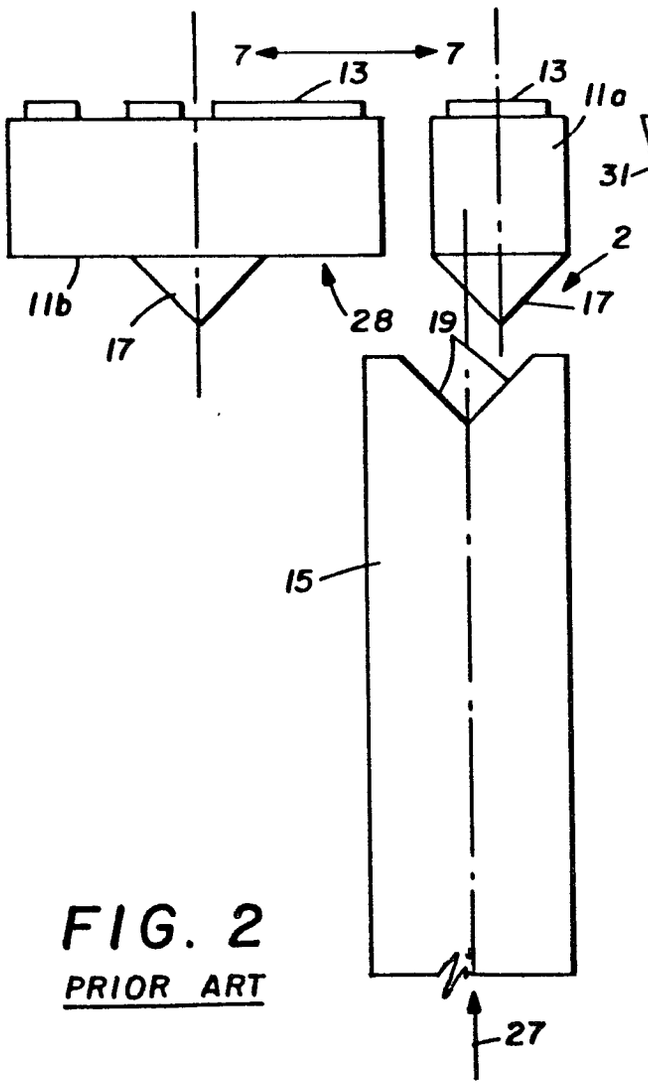


FIG. 2
PRIOR ART

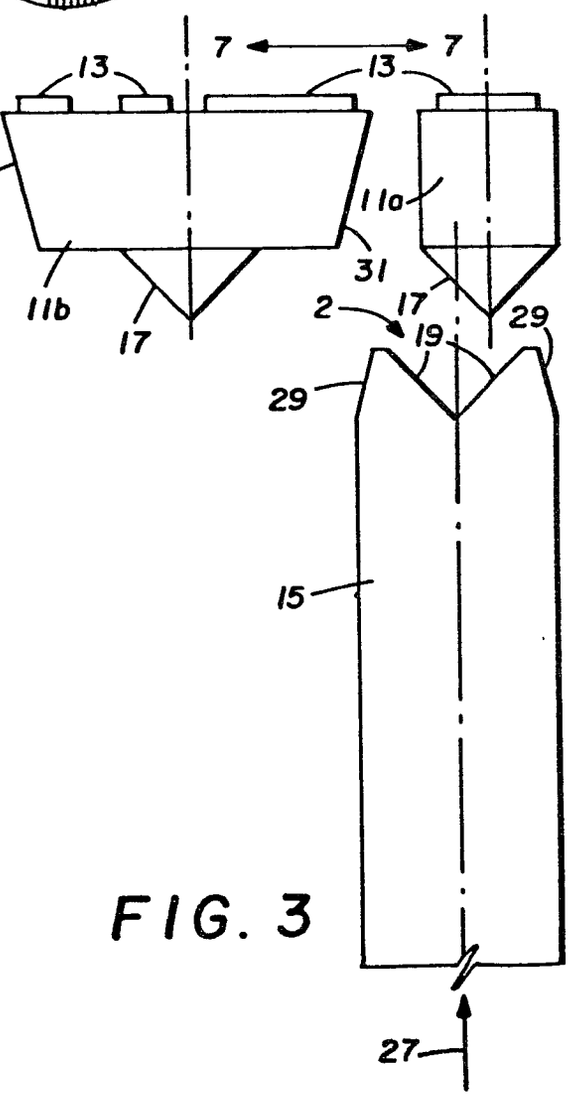


FIG. 3

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European Patent Office

Application number

EP 80 30 3396

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	US - A - 3 442 365 (E.L. RAGLAND) * Column 3, line 27 till column 4, line 8; figures 1-5 *	1
	US - A - 3 935 937 (TRAMPOSCH) * Figures 5,7 *	2
P	DE - A - 2 836 012 (SIEMENS) * Page 6, line 6 till page 7, line 25; figures 1-5 *	1
A	FR - A - 1 575 348 (SIEMENS AG) * En entier *	

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

B 41 J 9/133
1/24

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

B 41 J

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	06-01-1981	VAN DEN MEERSCHAUT