PRINTING DISC HAVING BIFURCATED TYPE ARMS

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ABSTRACT

A one-piece disc-shaped printing matrix for a serial printer, which matrix is adapted to be rotatably indexed to bring selected type elements thereon to a predetermined print position. The matrix is provided with a plurality of radially extending arms, each of which has at least two type-carrying fingers radially extending therefrom.

3 Claims, 7 Drawing Figures
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PRINTING DISC HAVING BIFURCATED TYPE ARMS

BACKGROUND OF THE INVENTION

The radial spokes or arms of conventional type printing discs or matrices used in certain high speed serial printers are provided with type elements at their respective free outer ends and in operation are deflected to a predetermined extent by a suitable hammer means so that said type elements are respectively brought into printing cooperation with a print receiving sheet. These cantilevered arms must be rigid enough to accommodate the rapid angular acceleration and deceleration occurring during the rotational indexing of the print disc, however they must also be flexible enough to be readily deflected during the above noted printing operations. The relatively high flexing stresses developed at the radially inner ends of said arms during printing and/or indexing operations are apt to cause failure in this region, i.e., where the said arms are joined to the central hub portion of the disc. For a given outside diameter of a print disc, this maximum flexing stress may be excessively high where said arms are relatively short but may be reduced in some cases by making the arms longer; the latter being accomplished by reducing the effective diameter of the said central hub portion of the disc. When lengthening such however the cross sectional size and/or shape of the arms in said region may be decreased or otherwise changed so that the disc material in said region may become structurally weaker and thus less able to withstand the repeated flexing stresses occurring during successive indexing and printing operations.

SUMMARY OF THE INVENTION

The present invention is directed towards a construction and arrangement for the radial type-carrying members of a print disc whereby the maximum flexing stresses developed during bending of a print arm through a given distance are minimized to the point where the chance of breakage or failure of the arms is substantially eliminated. To this end each arm of the instant print disc is given a bifurcated construction whereby the radial outer portion of each arm carries at least two radially extending type-supporting fingers. Further the axial thickness of each arm is increased in the region where its associated fingers join the arm, and each finger is made longer than its associated arm in order to efficiently distribute the stresses existing in each arm as the latter is flexed.

The primary object of the instant invention is to provide a novel disc-shaped print matrix which is relatively inexpensive to produce and which is light and rigid enough for effective use in high speed serial printers.

A further object of the invention is to provide a novel construction and arrangement for a print disc whereby the maximum operational flexure stresses in the radial arms thereof may be kept at relatively low values.

In the drawings:

FIG. 1 is a front elevational view illustrating a conventional type print matrix.

FIG. 2 is a cross sectional view taken along section line 2—2 of FIG. 1.

FIG. 3 is a front elevational view illustrating another conventional type matrix that is similar to that shown in FIG. 1.
each pair of fingers being axially thickened and reinforced as illustrated at 24 of FIG. 6. Suitably secured to the free outer end of each finger 23 is a type element 26, a circular array of type elements thus being formed. For discussion purposes each of the print discs 10, 10a, and 20 are here considered to have the same effective outside radius r1.

The width of each finger 23 as seen in FIG. 5, is substantially uniform throughout its length and is substantially equal to the corresponding width w of the radial inner portion of the associated arm 22. Each finger 23 is made as long as possible, and preferably is longer than its associated arm 22. The effective radial length l2, FIG. 5, for each composite cantilever support for type elements 26 is shown equal to the corresponding arm length l1 for the disc 10 of FIG. 3 and is effectively defined by the combined radial length of the associated finger 23 and arm 22. Here however there are only half as many arms 22 as type elements 26 so that the said width w of said arms 22 may now be made substantially greater than the corresponding width of arms 12a, FIG. 3, which in turn will insure that only relatively low operational flexure stresses are developed in the region 25 where arms 22 connect with the hub portion 21. Thus the advantages of a lengthened cantilever support for each type element are obtained here without otherwise incurring the usual accompanying disadvantage of high stress development at the base of the type support arms.

In operation, the type disc 20 is adapted to be rotatably indexed about its axis R1, FIG. 6, to bring a selected type element to a predetermined print position. After each disc indexing step an associated hammer action, indicated at 30, will cause the selected type element, such as 26x, to be displaced through the same predetermined fixed distance d to a print position as illustrated in said FIG. 7. During this printing action the adjacent type element 26y supported on the same arm as type element 26x is simultaneously displaced through a relatively short distance towards said print receiving sheet 15, this short displacement however being insufficient to produce any printing action by the type element 26y.

By utilizing the above described construction and arrangement for disc 20 the arms 22 thereof may be made rigid enough to accommodate rapid rotational indexing motion occurring during high speed serial printer operations and yet may be flexible enough to be readily deflected to print positions without developing high flexure stresses at the inner ends of said arms. These advantageous features will impart to the print disc 20 a long reliable operational life devoid of mechanical failures or breakages.

What is claimed is:

1. A rotative printing disc for use in a high speed serial printer, said printing disc adapted to be rotatively movable so as to be indexed to any one of several select print positions, said printing disc comprising a central hub portion and a plurality of arms carried by, and substantially radially extending from, said hub portion; each of said arms being bifurcated to provide a pair of outwardly extending type supporting fingers, each of said fingers having an outer end; a separate type element mounted on each of said outer ends; and each finger of each pair of the outwardly extending type supporting fingers being longer than its respective arm.

2. The rotative printing disc of claim 1, wherein said arms and fingers are reinforced by an enlarged section in a region defining the bifurcation of said arms.

3. The rotative printing disc of claim 1, wherein said arms and said fingers are disposed in a substantially common plane.

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