United States Patent [19]

Isaac

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[54] **TYPEHEAD CHARACTER RASTER FOR PLOTTING**

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[52] **U.S. Cl.** .....**197/1 R,** 197/8, 101/368, 101/399

[51] **Int. Cl.** **B41j 3/00**

[58] **Field of Search** 197/1, 8; 101/399, 101/368

[56] **References Cited**

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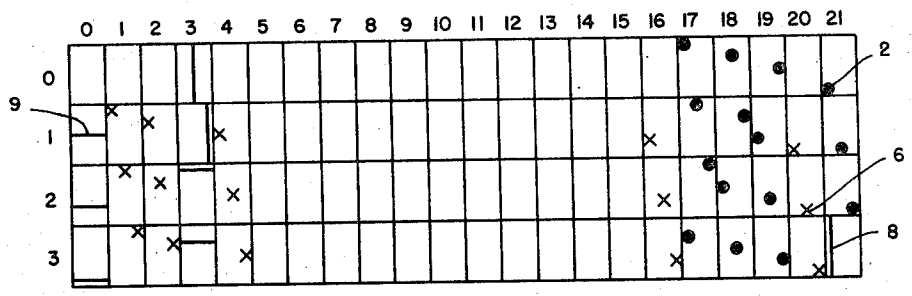
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Assistant Examiner—Clifford D. Crowder
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[57] **ABSTRACT**

A character raster for movable typehead printing elements which prints gridded graphs with uniform X–Y resolution.

2 Claims, 4 Drawing Figures



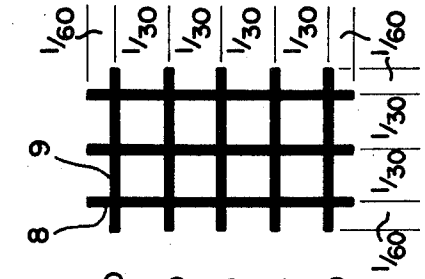


FIG_3

FIG_2

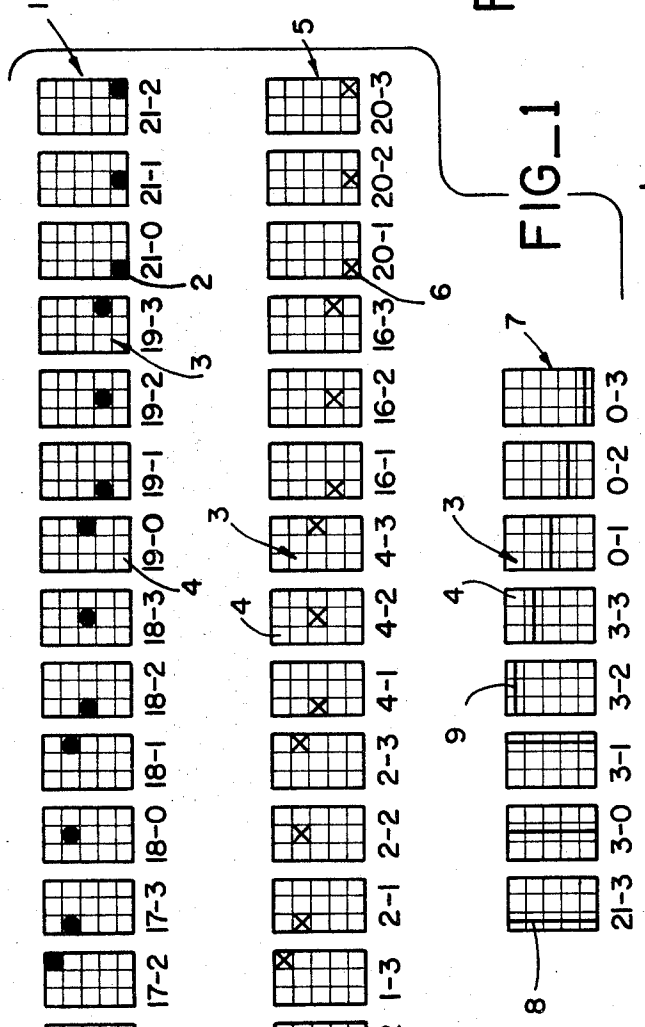
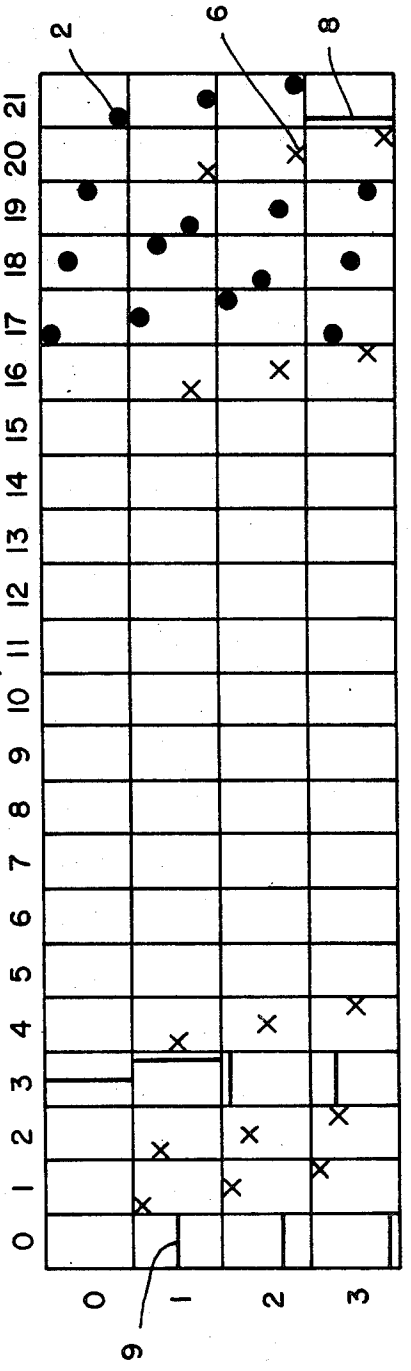


FIG_1

FIG_4



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TYPEHEAD CHARACTER RASTER FOR PLOTTING

The principal object of this invention is to provide a character raster for movable typehead printing elements that will print gridded graphs with uniform resolution on X–Y coordinate axes.

Another object of the invention is to provide a character raster for movable typehead printing elements for plotting with a resolution which is compatible with standard Fortran language when applied to commercial eighty-eight character elements.

Other objects and advantages of the invention will become apparent upon consideration of the following description and the accompanying drawings wherein:

FIG. 1 illustrates the character raster of the invention and the location of characters on each printing face of a typehead element;

FIG. 2 shows a printed composite of one set of plotting characters of the raster of FIG. 1 printed at a single typehead printing position;

FIG. 3 shows a printed composite of the set of grid characters of the raster of FIG. 1 printed at a single typehead printing position; and

FIG. 4 by column and row shows the location of the individual characters of the described raster on a typical 88 character typehead.

The character raster of this invention is particularly applicable to movable typehead printing devices of the kind disclosed generally in U. S. Pat. No. 2,919,002 issued on Dec. 29, 1959 to L. E. Palmer entitled "Selection Mechanism For a Single Printing Element Typewriter." Such heads are translatable in uniform horizontal increments along an X-axis and in uniform vertical increments along a Y-axis, which usually are not the same in length. The same raster also is useful in other printing devices such as teletype machines and high speed printers. For purposes of this application the term "raster" means a group, and in this context, a group of specifically configured characters.

The illustrated embodiment of the raster includes three sets of characters. One set 1 for plotting comprises a series of 15 dots 2 1/30 inch in diameter and distributed uniformly over an imaginary grid pattern 3 as is shown in the first line of FIG. 1 at 17–0 through 21–2. The disclosed grid accommodates the 1/6 inch vertical (line to line) and 1/10 inch horizontal (character to character) increments widely used in present day movable typehead machines. The imaginary grid 3 comprises square grid units 4 at least the overall dimension of the plotting characters 2 on a side and the vertical and horizontal increments are whole number multiples of them. For example, for the illustrative 1/30 inch characters and 1/6 inch vertical and 1/10 inch horizontal increments, the imaginary grid 3 is three units 4 wide and five units high. The fifteen dots 2 distribute uniformly over the grid, one centered on each unit. This provides a 1/30 inch resolution in both the horizontal and vertical directions when used in conjunction with such spacing of 1/6 inch between lines and 1/10 inch between characters in a line. In the example the imaginary grid defines fifteen locations equally spaced over the 1/10 inch width and the 1/6 inch height of a standard ten pitch type face.

FIG. 2 is a printed composite at a single printing position of the typehead of all fifteen plotting characters 2 to illustrate more clearly their relative location on the typehead printing faces.

The raster also includes a second set 5 of 15x's 6 also distributed over the same three by five imaginary grid 3 to provide identical resolution. Each x comprises the diagonals of one of the 1/30 × 1/30 inch square units 4 of the grid.

The third set 7 of characters comprises three vertical grid line characters 8 and five horizontal grid line characters 9 each centered on a separate row of units 4 in the three by five grid pattern. The vertical grid line characters 8 are 1/6 inch long and the horizontal grid line characters 9 are 1/10 inch long to print uniformly spaced continuous grid lines upon the intersections of which the plotting characters of sets 1 and 2 are centered.

FIG. 3 is a composite of the grid line characters in set 7 to illustrate the dimensional relationship between the various characters if all were printed at the same typehead printing position.

FIG. 4 shows the position for all characters of the raster on a typical movable typehead having eighty-eight character positions. The numbering on each character in FIG. 1 indicates its position on the typehead raster by numbered columns 0 to 21 and rows 0 to 3 shown on FIG. 4. The plotting and grid line characters aggregate 38. They, added to the normal 48 characters of standard Fortran commonly used in general scientific computing, are an efficient match for the 88 character raster of commercially available typeheads.

The specific embodiment is described for illustrative purposes only. It will be apparent to those skilled in this art that modifications to the structure may be practiced and equivalents substituted for the specific elements described which are within the scope of the invention defined in the following claims.

I claim:

1. A movable printing head translatable in uniform horizontal increments along an X-axis and in uniform vertical increments along a Y-axis wherein said horizontal increments are not equal in length to said vertical increments and said head has 88 characters, 48 of which are committed to standard Fortran,

an improved character raster for printing at least two graphs at each increment with uniform X–Y resolution comprising

a first set of identical plotting characters;

a second set of differently shaped but identical plotting characters;

each set having the same overall dimension in the direction of said X and Y axes and which dimension is one-third of said horizontal increment and is one-fifth of said vertical increment and

said plotting characters of each set being uniformly distributed over an imaginary grid composed of square units at least said overall dimension on a side, and which grid extends three units along the X-axis and five units along the Y-axis; and

a set of identical coordinate grid line characters including three vertical line characters and five horizontal line characters,

each of said line characters being centered upon a different row of units of said imaginary grid.

2. The improved character raster of claim 1 wherein said overall dimension is 1/30 inch and said units are 1/30 inch on each side.

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