

Four-point correspondence type individual information mark sheet

This invention relates to a shaded code which may be printed on a mark sheet from which mark sheet information can be accurately read by means of a sensor.

In conventionally used bar code sheets, micro unit accuracy of the widths of the written bars is required. Whether the bars are written manually or printed, this imposes many technical limitations, resulting in high cost.

The invention uses a code-marking system which is much more tolerant of registration errors in reading and writing. The invention provides a shaded code marking sheet capable of being read by a sensor even when there are comparatively large registration errors, said code having a plurality of characteristics, comprising at least one unit, each unit being divided into four regions of substantially similar size each characteristic of the code being represented by a respective unit having a particular arrangement of shaded or blank regions and each characteristic corresponding to the respective unit being displayed adjacent thereto.

In this four-point correspondence type individual

information mark sheet, without making the write spaces large, the data can be read accurately even if there is some degree of overflow in manual writing.

A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings, in which: -

Fig. 1 is a front view showing how the four-point correspondence type individual information mark shading regions are divided;

Fig. 2 gives respective front views showing how the numerals are represented by four-point correspondence type individual information mark shaded regions;

Fig. 3 is a front view showing, from one side, a method of four-fold division to constitute the four-point correspondence type individual information marking;

Fig. 4 is an exploded perspective view of a master sheet;

Fig. 5 is a front view of an information sheet on which no entries have yet been made;

Fig. 6 is a front view of an information sheet having required information; and

Fig. 7 is a front view showing how the character which is equivalent to a four-point correspondence type individual information marking may be entered next to this marking.

- 1 ... point A
- 2 ... point B
- 3 ... point C
- 4 ... point D
- 6 ... four-point correspondence type individual
information marking
- 8 ... one side of four-fold division of four-point
correspondence type individual information marking
- 9 ... holes for passage of light
- 10 .. masking sheet
- 20 .. 0 location (equivalent character)

For a single item of information, the shading region is divided into four portions as shown in Fig. 1. The various data are represented by combinations of shading locations (in this case, 4 - 1 types of information are possible). Explaining this with reference to Fig. 2, in

a method wherein one point only is shaded in an anticlockwise direction taking point A (1) in Fig. 1 as the starting point, we may represent point A (1) by numeral I, point B (2) by numeral II, point C (3) by numeral III, and point D (4) by numeral IV. Numeral V is represented by shading two points, viz., point A (1) and point C (3).

In a method wherein two points are shaded in an anticlockwise direction, numeral VI is represented by points A (1) and B (2), numeral VII by points B (2) and C (3), numeral VIII by points C (3) and D (4), and numeral IX by points D (4) and A (1), while 0 is represented by shading all the points. The above method is easily remembered and enables representation without any mistake.

If one side (8), shown in Fig. 3, of the four-fold division of the four-point correspondence type individual information marking (6) is taken as a mm, and the diameter of the light passage holes (9) of the master sheet (10) shown in Fig. 4 is taken as b mm (in this case $a > b$), accurate reading is possible within a positional error range of $(a - b)/2$ mm in the vertical or horizontal direction.

Also, even if there is some overflow of shading, so long as it does not affect the other information portions, accurate reading of information will be possible. For single article information or small lot information, a required information sheet as shown in Fig. 6 can be produced in a simple manner by entering the required data by manually marking the respective portions on a blank information sheet as shown in Fig. 5 (printed with numbers to designate the spaces as required).

Also, in cases where a large number of identical information sheets are required, a printing negative plate may be prepared on which the required quantity of information following the rules of Fig. 2 is arranged in the requisite sequence, sheets being used that are printed from this negative. In this case, to prevent information errors, in each of the portions (20) indicated by a "0" shown in Fig. 7, explanatory equivalent characters (numerals) may be provided to eliminate errors in proof-reading.

Possibilities of Industrial Utilization

This invention enables reading by the same method as reading bar codes but tolerates some degree of overflow

or deficiency of manual writing, so the original information can be read accurately by simpler reading methods than conventionally. Also, the techniques used for printing can be the conventionally known methods, so that it can be produced in a simple manner by manual writing, unlike bar code sheets.

As future uses, application to communications (telephone, telex, facsimile, etc.) mass media publications (newspapers, sound-producing pictures, talking dictionaries, TV and radio guides), data processing (accessing data bases), distribution (simply implemented POS, automatic selection), manufacturing management (process steps, warehouse management, etc.), service (automatic ticket checking, telephone shopping, consultation tickets, etc.), new toys and electrical equipment and devices, etc. may be considered.

To summarise, the invention may be used to provide a four-point correspondence type individual information marking sheet capable of being accurately read by a sensor even in the presence of comparatively large errors in the printing or manual writing of the marking information writing portions.



CLAIMS

1. A shaded code marking sheet capable of being read by a sensor even when there are comparatively large registration errors, said code having a plurality of characteristics, comprising at least one unit, each unit being divided into four regions of substantially similar size each characteristic of the code being represented by a respective unit having a particular arrangement of shaded or blank regions and each characteristic corresponding to the respective unit being displayed adjacent thereto.

2. A shaded code marking sheet as claimed in claim 1 wherein each unit and each region is a square.

3. A shaded code marking sheet substantially as described herein with reference to the accompanying drawings.
