

Title:- A METHOD OF PROVIDING A MARK ON A SURFACE-TYPE FASTENER

Description:-

This invention relates generally to a method of providing a mark on a surface-type fastener having a number of interlocking elements, such as loops or hooks on a woven or knitted foundation fabric,

A surface-type fastener generally known as a loop-and-hook fastener has an obverse surface from which a number of interlocking elements such as loops or hooks project. Due to the presence of the interlocking elements, it is difficult to provide a mark or design on the obverse surface.

For example, Japanese Utility Model Publication No. 44-30456 published on December 15, 1969 discloses a surface-type fastener having a mark provided on the obverse surface of a foundation fabric by embroidering, painting, or figure weaving. The embroidering is tedious and time consuming per se and also it is disadvantageous in that an ornamental yarn is likely to entangle several interlocking elements, thereby tilting the latter. The tilted interlocking elements are difficult to properly engage with the interlocking elements on a mating fastener strip. Also, painting is

unsatisfactory in that the distal ends of the interlocking elements are painted intensely with the result that only an unclear mark is created on the obverse surface. Further, figure weaving requires a
5 complex weaving mechanism which leads to an expensive fastener.

Another example of marked surface-type fastener is disclosed in Japanese Utility Model Publication No. 56-40803 published on September 24, 1981. The
10 disclosed fastener has a design produced on the obverse surface of a foundation fabric by fusing a part of the interlocking elements of thermoplastic filamentary material. The fused portion of the interlocking elements is no longer effective to perform its
15 prescribed interlocking function.

Japanese Utility Model Laid-open Publication No. 58-191808 discloses a surface-type fastener having marks on the obverse surface of a foundation fabric. To provide the marks, an elongate strip of synthetic
20 resin is placed over interlocking elements and then portions of the strip and interlocking elements are fused to the obverse surface by means of a heated seal-cut press. The interlocking elements thus fused do not contribute to interlocking engagement with the
25 interlocking elements of a mating fastener strip.

According to the present invention, there is provided a method of providing a mark on a surface-type fastener including a number of interlocking elements on one surface of a foundation fabric, said method comprising the steps of:

5 separating a mark to be provided on the surface-type fastener, into a plurality of picture elements having individual positional data; continuously directing electrified particles of ink toward said one surface of

10 the foundation fabric; and successively deflecting said electrified ink particles according to said positional data before said electrified ink particles impinge on

said one surface.

The invention will be described by way of example with reference to the accompanying drawings, wherein like references refer to like parts unless stated otherwise and wherein:-

Figure 1 is a schematic perspective view of a surface-type fastener marked in accordance with the present invention, the view showing the fastener as attached to an article; and

Figure 2 is a diagrammatical view illustrating a manner in which a mark is provided on one surface of a foundation fabric.

Figure 1 shows a surface-type fastener 10 as attached to an article 12. The surface-type fastener 10 includes a foundation fabric 14, and a number of interlocking elements 16 disposed on and projecting from one surface 17 of the foundation fabric 14. In the illustrated embodiment, the interlocking elements comprise hooks 16 formed by severing loops of thermoplastic monofilament. The surface 17 is normally exposed to sight and it is hereinafter referred to as the "obverse surface". The obverse surface 17 has a mark 18 (letter "A" in the illustrated embodiment) composed of dot lines threading between the interlocking

elements 16. The interlocking elements 16 have a portion located adjacent to the mark 18 and having a shape and interlocking function which is the same as the shape and interlocking function of the remaining portion of the interlocking elements 16. The foundation fabric 14 is formed of natural or synthetic yarns woven or knitted together. The hook-shaped interlocking elements may be substituted by loops or mushroom-shaped interlocking elements.

10 Preferably, the mark 18 is provided on the obverse surface 17 by an ink-jet printer 20 shown in Figure 2. The ink-jet printer 20 comprises a nozzle 22 for directing electrified particles 26 of ink toward the obverse surface 17, and a pair of confronting
15 deflecting electrodes 24 disposed between the nozzle 22 and the surface 17 for deflecting the electrified ink particles 26 before the ink particles impinge against the obverse surface 17. More specifically, a mark 18 to be produced is separated into a number of segments
20 or picture elements having individual positional data, each picture element comprising a dot. Then the ink particles 26 are charged with electricity by a suitable changing means (not shown) as they advance toward the obverse surface 17. The changing voltage is set to
25 vary in proportion to the positional data of the respective picture elements. The electrified ink particles 26 pass through a static electric field

generated between the deflecting electrodes 24,
whereupon they are successively deflected in the
scanning manner according to the positional data. The
deflected ink particles 26 impinge the obverse surface
5 17 and then are deposited thereon in the form of a
number of dots which constitute the mark. Designated
at 28 is an electric source for energizing the
deflecting electrodes 24.

With the use of the ink-jet printer 20, it is
10 possible to deposit the ink dots on the obverse surface
17 without interference with the interlocking elements
16 so that a clear and distinctive mark 18 is provided
on the obverse surface 17. The surface-type fastener
10 with such clear and distinctive mark 18 has a high
15 trade value. The mark 18 thus provided is composed of
a number of dots threading between adjacent ones of the
interlocking elements 16. Thus, printing is achieved
without affecting negative influence on the shape and
interlocking function of those interlocking elements
20 which are located adjacent to the printed mark. It may
be possible to arrange the picture elements such that
some of them overlap the interlocking elements 16. In
this instance, the interlocking elements located in the
region of the mark are colored but they still retain
25 their initial shapes.

When printing letters of a given form or pattern on the
obverse surface 17, a keyboard (not shown) is used in

combination with the ink-jet printer 20, the keyboard including a memory for storing the given form of the letters. The voltage across the deflecting electrodes 24 is changed depending on the output signal delivered
5 from a selected key of the keyboard.

More complicated marks, designs or letter of various forms may be printed on the obverse surface 17 by controlling operation of the ink-jet printer 20 by a microcomputer (not shown). Marks of different colors
10 can be provided on the obverse surface 17 by employing three ink-jet printers adapted to eject ink particles of three primary colors.

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CLAIMS:

1. A method of providing a mark on a surface-type fastener including a number of interlocking elements on one surface of a foundation fabric, said method comprising the steps of:

(a) separating a mark to be provided on the surface-type fastener, into a plurality of picture elements having individual positional data;

(b) continuously directing electrified particles of ink toward said one surface of the foundation fabric; and

(c) successively deflecting said electrified ink particles according to said positional data before said electrified ink particles impinge on said one surface.

2. A method according to claim 1, each said picture element comprising a dot.

3. A method according to claim 1 or 2, said deflecting being carried out in such a manner that said electrified ink particles thread between adjacent interlocking elements.

4. A method of providing a mark on a surface-type fastener as claimed in claim 1 and substantially as described with reference to and as illustrated in Figure 2 of the accompanying drawings.



of ink toward said one surface of the foundation fabric;
and

(c) successively deflecting said electrified
ink particles according to said positional data before
5 said electrified ink particles impinge on said one surface.

5. A method according to claim 4, each said
picture element comprising a dot.

6. A method according to claim 4 or 5, said
deflecting being carried out in such a manner that said
10 electrified ink particles thread between adjacent
interlocking elements.

7. A surface-type fastener substantially as
described with reference to and as illustrated in Figure
1 of the accompanying drawings.

15 8. A method of providing a mark on a surface-
type fastener substantially as described with reference
to and as illustrated in Figure 2 of the accompanying
drawings.
