

Textile strip comprising an integrated antenna thread
for an RF transponder

Technical field

- 5 The invention relates to a textile strip comprising an integrated antenna thread for an RF transponder.

Prior art

10 A textile strip of the type mentioned initially is known, for example, from WO0136728. There, for example, conductor tracks serving as antennae are introduced, inter alia, as successive wefts of a basic fabric. The disadvantage of this is that the individual limbs of the conductor thread lie closely to one another, and
15 there is the constant risk of short circuits, insofar as the conductor threads are not provided with complicated insulation.

US 6 677 917 discloses fabrics, such as, for example, articles of clothing, to which, for example, radio
20 frequency transponders, what are known as RF transponders, can be fastened, and which have an integrated antenna. However, this does not describe in detail how such an antenna thread is to be fastened to a fabric.

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Presentation of the invention

The object of the invention is to specify a textile strip, in which an antenna thread can be integrated during production, the risk of short circuits in the
30 antenna thread being avoided.

The set object is achieved by means of the characterizing features of claim 1.

35 By the antenna thread being arranged on a basic fabric, the antenna thread can in a simple way, on the one hand, be connected to the basic fabric and, on the

other hand, be attached in a meander-shaped or zigzag-shaped manner, so that the required length of the antenna thread can be distributed over a relatively short portion of the textile strip. Since the spacing
5 of the limbs of an antenna thread loop at at least one strip edge amounts to at least two wefts of the basic fabric, moreover, this ensures that adjacent limbs of the antenna thread do not touch one another, thus ruling out short circuits which would adversely
10 influence the required length of the antenna thread.

Advantageous refinements of the invention are described in claims 2 to 6.

15 According to claim 2, the antenna thread may have at fastening points loops through which a basic fabric weft runs. This design is relatively simple, but has the disadvantage that the tie-up point of the antenna thread is visible on the other side of the basic
20 fabric.

The refinement as claimed in claim 3 is more advantageous, according to which the antenna thread is arranged in the manner of a weft thread loop. This is
25 inserted at one strip edge and is fastened at the other strip edge by means of at least one stitch. To secure the antenna thread to the basic fabric, there is in each case at least one floating warp thread which is arranged above each pair of limbs of each antenna
30 thread loop. It is particularly advantageous if, according to claim 4, a warp thread floating over the antenna thread is designed so as to be adhesive or fusible and is adhesively bonded or fused to the antenna thread in a punctiform manner.

According to claim 5, the length of the antenna thread is coordinated in a known way with the RF transponder to be arranged.

- 5 The refinement as claimed in claim 6 is particularly advantageous, according to which the textile strip is designed as a label strip which, as a rule, has a plurality of labels, each label containing an antenna thread of predetermined length. The individual labels
10 are then detached from the label strip and form individual labels. Each such label may be or become equipped with a corresponding RF transponder.

Brief description of the drawings

- 15 Exemplary embodiments of the invention are described in more detail below with reference to the drawings in which:

- figure 1 shows a textile strip with an antenna thread
20 arranged in a meander-shaped manner, in a top view;
figure 2 shows the textile strip of figure 1 in the section II-II;
figure 3 shows the textile strip of figure 1 in the
25 section III-III;
figure 4 shows a further textile strip with an antenna thread arranged in a zigzag-shaped manner, in a top view;
figure 5 shows a further textile strip with an antenna
30 thread arranged in a zigzag-shaped manner, in a top view.

Ways of implementing the invention

- Figures 1 to 3 show a detail of a textile strip, the
35 basic fabric 2 of which has been produced in the usual way on a needle loom. The basic fabric has warp threads, not illustrated in any more detail, in which

are tied in weft thread loops, likewise not illustrated in any more detail, which are introduced in a known way from one side by means of a weft insertion needle and on the other side are tied off by means of a knitting
5 needle. In this case, the weft thread loops may be tied off by means of the knitting needle in various ways in that the weft thread loops are secured either to themselves or by means of an auxiliary thread.

10 An antenna thread 4 is arranged in a meander-shaped manner on this basic fabric 2. The antenna thread 4 is arranged in the manner of a weft thread loop, being inserted from one strip edge 6 and being fastened on the other strip edge 8 in each case by means of a
15 stitch 10. To secure the antenna thread 4, there are floating warp threads 12 which run in each case over the pairs of limbs 14a, 14b of an antenna thread loop, as may be gathered particularly from figures 2 and 3. The floating warp threads are preferably designed so as
20 to be adhesive or fusible and are adhesively bonded or fused to the antenna thread in a punctiform manner.

In the example of figures 1 to 3, the limbs 14a, 14b of the antenna thread loops run parallel, and the spacing
25 of the limbs amounts at both strip edges 6, 8 to a plurality of wefts of the basic fabric.

To produce such a textile strip having an antenna thread, there are, for example, needle looms and weft
30 insertion needles, such as are described, for example, in DE 24 00 101 C, EP 0 121 648 A, GB 2 146 665 A, US 5 564 477 A and CH 663 629 A. To insert the antenna thread loop, the operation of weaving the basic fabric 2 is stopped, and an auxiliary shed is formed from the
35 floating warp threads 12 and the warp threads of the basic fabric, an antenna thread loop then being inserted into said auxiliary shed from the strip edge 6

and being tied off at the opposite strip edge 8 by means of an auxiliary thread so as to form the stitch 10. This auxiliary shed then remains open over as many wefts of the basic fabric as are necessary to achieve the desired spacing of the limbs 14a, 14b of the antenna thread loop. A renewed stopping of the operation of weaving the basic fabric then takes place, and a tie-off of the antenna thread loop by means of a second stitch 10a, whereupon the auxiliary shed is closed. The antenna thread loop may also be fastened by means of more than two stitches 10, 10a. A separate warp thread 12a runs over each stitch 10, 10a. For each insertion of an antenna thread loop, the operation is repeated, until the desired length of the antenna thread is arranged.

Figure 4 shows a further textile strip which is constructed and produced in a similar way to the textile strip of figures 1 to 3, although, in this case, the antenna thread 4a runs in a zigzag-shaped manner. For this purpose, the inserted antenna thread loop is tied off at the strip edge 8 by means of only one stitch 10. The limbs 14a, 14b of an antenna thread loop have the spacing of one weft at one strip edge 8 and the spacing of a plurality of wefts of the basic fabric at the other strip edge 6 only.

Figure 4 shows a further example of a textile strip, the basic fabric 2a of which has been produced on a needle loom. For this purpose, basic fabric wefts 16 are inserted from one strip edge 6 and are tied off at the other strip edge 8 by means of a knitting needle in a way not illustrated in any more detail, but known, as is shown, for example, in CH 490 541. An antenna thread 4b is arranged in a zigzag-shaped manner on the basic fabric 2a. At the connection points 18, the antenna thread 4b forms loops 20 through which the basic fabric

weft 16 is led. The production of this textile strip takes place, for example, according to CH 490 541, in that the antenna thread 4b is supplied above the warp shed and introduced in each case at the fastening
5 points into the open fabric shed by means of a dagger, so that the corresponding basic fabric weft 16 can penetrate and fasten the loop 20. This fastening technique, on the one hand, is relatively complicated and, on the other hand, has the disadvantage that the
10 loop 20 of the antenna thread 4b is visible on the opposite side of the textile strip. Here, too, as in the example of figure 4, the spacing of the limbs of an antenna thread loop amounts at one strip edge to only one weft of the basic fabric and at the other strip
15 edge to a plurality of wefts of the basic fabric.

The textile strip is preferably designed as a known label strip carrying successive labels which may be provided with printed-on and/or woven-in images and
20 characters. Such a label strip is likewise subdivided in a known way into individual labels.

Such labels may be equipped, for example, with an RF transponder which is designed for 868 MHz and requires
25 an adapted antenna thread which is approximately 17 cm long.

List of reference symbols

2	Basic fabric
2a	Basic fabric
4	Antenna thread
4a	Antenna thread
4b	Antenna thread
6	Strip edge
8	Strip edge
10	Stitch
10a	Stitch
12	Floating warp thread
12a	Floating warp thread
14a	Limb
14b	Limb
16	Basic fabric weft
18	Connection point
20	Loop

Patent Claims

1. A textile strip comprising an integrated antenna thread for an RF transponder, characterized in that it is designed with a basic fabric (2, 2a) which is produced on a needle loom and on which the antenna thread (4, 4a, 4b) has been arranged on the basic fabric in a meander-shaped or zigzag-shaped manner simultaneously with the production of the basic fabric, the spacing of the limbs (14a, 14b) of an antenna thread loop amounting at at least one strip edge (8) to at least two wefts of the basic fabric.

2. The textile strip as claimed in claim 1, characterized in that the antenna thread (4b) has at connection points (18) loops (20) through which a basic fabric weft (16) runs.

3. The textile strip as claimed in claim 1, characterized in that the antenna thread (4, 4a) is arranged in the manner of a weft thread loop which is inserted at one strip edge (6) and is fastened at the other strip edge (8) by means of at least one stitch (10, 10a), in each case at least one floating warp thread (12, 12a) running over the pairs of limbs (14a, 14b) of each antenna thread loop.

4. The textile strip as claimed in one of claims 1 to 3, characterized in that a warp thread floating over the antenna thread (4, 4a, 4b) is designed so as to be adhesive or fusible and is adhesively bonded or fused to the antenna thread in a punctiform manner.

5. The textile strip as claimed in one of claims 1 to 4, characterized in that the length of the antenna thread (4, 4a, 4b) is coordinated with the RF transponder to be arranged.

6. The textile strip as claimed in one of claims 1 to
5, characterized in that it is designed as a label
strip with a plurality of labels, each label containing
5 an antenna thread (4, 4a, 4b) of predetermined length.