



**Needle-type ribbon weaving machine for producing a
ribbon fabric and ribbon fabric**

Technical Field

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The invention relates to a needle-type ribbon weaving machine for producing a ribbon fabric according to the preamble of claim 1 and to a ribbon fabric of this kind according to the preamble of claim 8.

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Prior Art

A needle-type ribbon weaving machine and a ribbon fabric produced by it are known from CH-A-598 382. Due to the knitting needle present on the insertion side and on the discharge side, on the one hand, the needle-type ribbon weaving machine has a complicated construction and, on the other hand, the ribbon fabric is exposed, during production, to very high loads which make it possible for the ribbon fabric to be distorted. The production of the ribbon fabric is made difficult and is possible only with a low output.

Presentation of the invention

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The object of the invention is to improve further a needle-type ribbon weaving machine and a ribbon fabric of the type initially mentioned.

30 The object is achieved, according to the invention, by:
the needle-type ribbon weaving machine of claim 1;
the ribbon fabric according to claim 8.

Since the knitting needles for the insertion side and

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Weft thread crocheted at both ribbon edges

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the discharge side are pivotable about the same axis of rotation, this results in a construction which is simple and, in particular, symmetric on both ribbon sides and which is conducive to a tie-up which is the
5 same on both ribbon sides, thus preventing the ribbon fabric from being distorted.

Since the needle-type ribbon weaving machine has a second knitting needle for interlacing on the insertion
10 side of the weft insertion needle, a ribbon fabric can be produced which has an at least approximately identical appearance at both edges, that is to say on the insertion side of the weft insertion needle into the shed and on the discharge side of the weft
15 insertion needle out of the shed. The technically superfluous interlacing on the insertion side of the weft thread loop into the shed gives the observer the impression that both ribbon edges of the ribbon fabric are identical. This initially leads at least to a
20 visual improvement in the ribbon fabric. However, the interlacings at both ribbon edges of the ribbon fabric also results in a ribbon fabric construction which is identical or at least very similar on both sides, with the result that the physical properties of the ribbon
25 fabric are improved. Thus, for example, a distortion of the ribbon fabric, in particular under load, is prevented. The resistivity of the two ribbon edges and consequently their susceptibility to wear are virtually the same. In particular, it was found that by the
30 ribbon edges being interlaced, the adverse properties of the reversal points of monofilament weft threads are avoided. The harsh sawtooth-like ribbon edges which are formed by the reversal points of monofilament weft threads are smoothed out by the interlacing, so that
35 the risks of material damage and/or personal injury are largely eliminated.

Advantageous refinements of the needle-type ribbon weaving machine are described in the dependent claims 2 to 7 and those of the ribbon fabric are described in the dependent claims 9 to 11.

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The interlacing on the insertion side of the shed may be identical to or different from the interlacing on the discharge side. For the interlacing, there are numerous exemplary embodiments, such as, for example, 10 the Müller weaving systems I to V described in KIPP, loc. cit., pages 84-94. The warp, weft and interlacing threads may consist of the most different possible materials and have the most different possible designs and dimensions. Particular advantages are afforded by a 15 ribbon fabric having a weft thread consisting of a monofilament thread and interlacing threads consisting of multifilament threads.

Brief description of the drawings

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

25 figure 1 shows the weaving region of a needle-type ribbon weaving machine in a top view;

figure 2 shows a detail of the needle-type ribbon weaving machine according to figure 1 in a 30 side view;

figure 3 shows the construction of a first ribbon fabric, in which a weft thread is tied up on both sides by means of an interlacing thread, 35 according to the Müller weaving system II;

figure 4 shows the construction of a second ribbon fabric, in which the weft thread is tied up on both sides with itself, according to the Müller weaving system I;

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figure 5 shows the construction of a third ribbon fabric, in which an interlacing thread and the weft thread are interlaced on both sides with themselves, according to the Müller weaving system III;

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figure 6 shows the construction of a fourth ribbon fabric, in which interlacing threads and blocking threads are interlaced with one another on both sides, according to the Müller weaving system V;

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figure 7 shows the construction of a sixth ribbon fabric, in which a second interlacing thread is introduced together with the weft thread.

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Ways of implementing the invention

Figures 1 and 2 show the weaving region of a needle-type ribbon weaving machine in a diagrammatic illustration, only the parts essential for the invention being illustrated. A shedding device 2 contains pattern-controlled heddles 4 which open warp threads 6 according to a pattern program to form a shed 8. A weft insertion needle 12 oscillatable about an axis 10 inserts a weft thread loop 14 of a multifilament or monofilament weft thread 16 into the shed 8 on an insertion side 18. The weft insertion needle 12 and consequently the weft thread loop 14 project from the shed 8 on the discharge side 20, said weft thread loop being tied up there by means of an interlacing 22.

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In the example of figures 1 to 3, the interlacing is formed by a multifilament interlacing thread 24 which is supplied via a thread guide 25 and is drawn through the weft thread loop 14 by means of a first knitting
5 needle 26 and interlaced with itself by means of a loop 28 consisting of the interlacing thread 24. This interlacing system is described as the Müller weaving system II in KIPP, loc. cit., page 86. On the insertion side 18, there is a further interlacing 30 which is
10 formed in a similar way to the interlacing 22 of the discharge side 20. The interlacing 30 is formed by a multifilament interlacing thread 34 which is supplied via a thread guide 32 and which is drawn by means of a second knitting needle 36 through a connection point 38
15 between adjacent weft thread loops 14 and is interlaced with itself.

The knitting needles 26, 36 are arranged in each case on rockers 40, 42 which are fastened to coaxial shafts
20 44, 46 pivotable about an axis of rotation 47 and are driven with phase displacement. The phase displacement may be 90° to 270° . A phase displacement of 180° preferably corresponds to the position, offset at 180° , of the weft insertion needle 12 on the insertion side
25 18 or the discharge side 20.

The needle-type ribbon weaving machine also contains a weaving reed 48 which beats up the weft thread loop 14 inserted into the shed 8 at the beating-up edge 50 of
30 the ribbon fabric 52. A ribbon guide 54 which follows the beating-up edge 50 extends at most over the entire width of the ribbon fabric 52 to be produced. The ribbon guide 54 ensures, downstream of the beating-up edge 50, a satisfactory guidance of the ribbon fabric
35 52 produced. This guidance is assisted by stitch knocking-over plates 56, 58 arranged on both sides of the ribbon guide 54, that is to say assigned to the

insertion side 18 and to the discharge side 20 respectively.

Figure 4 shows a second ribbon fabric 52a, in which the weft thread 16a is introduced, as in the example of figure 3, by means of the weft insertion needle 12 into the shed formed from the warp threads 6. The weft thread 16a is looped together with itself both on the discharge side 20 and on the insertion side 18 by means of the first knitting needle 26 and the second knitting needle 36 respectively. The head parts 60 of the weft thread loops 14a are correspondingly interlaced with themselves during interlacing 22a on the discharge side 20. Similarly, the connection points 38a between adjacent weft thread loops 14a are interlaced with themselves by means of the second knitting needle 36 on the insertion side 18, as may be gathered from figure 4. This is the Müller weaving system I in KIPP, loc. cit., page 85.

Figure 5 shows a third ribbon fabric 52b, in which the weft thread loop 14b introduced into the shed by means of the weft insertion needle 12 is provided on the insertion side 18 and on the discharge side 20 in each case with interlacings 30b and 22b which are formed from the interlacing threads 34a, 24a and the weft thread 16b which are therefore interlaced with one another in parallel. This is, here, the Müller weaving system III in KIPP, loc. cit., page 86.

Figure 6 shows a fourth ribbon fabric 52c, in which, once again, a preferably monofilament weft thread 16c in the form of a weft thread loop 14c is introduced into the shed 8 by means of the weft insertion needle 12. Both on the insertion side 18 and on the discharge side 20, the interlacing 30c, 22c is formed in each case from a multifilament interlacing thread 34b and

24b which in each case are guided through the connection points 38b of adjacent weft thread loops 14c or the head parts 60 of the weft thread loops, these interlacing threads 24b, 34b being interlaced by means
5 of the first and the second knitting needle 26, 36, on the one hand, with themselves and, on the other hand with an additional second interlacing thread 62, 64. This is, in this case, the Müller weaving system V in KIPP, loc. cit., page 87. Thread guides 66 and thread
10 placers 68 serve for feeding the various interlacing threads, so that these can be picked up by the knitting needles 26 and 36. The thread guides 66 can be driven by heddle frames or heddle carrier rails 78a, 78b, 78c of the shedding device 2 or be controlled by means of a
15 separate drive.

Figure 7 shows a fifth ribbon fabric 52d, in which a weft insertion needle 12a not only introduces a weft thread loop 14d of a monofilament weft thread 16d, but
20 is also provided with a further eye 70, in order to insert a loop 72 of a multifilament interlacing thread 34c into the shed simultaneously and in parallel with the weft thread loop 14d. This interlacing thread 34c is interlaced with itself on the insertion side 18 by
25 means of the second knitting needle 36. For this purpose, the connection points 74 of adjacent loops 72 of the interlacing thread 34c are interlaced with one another outside the connection point 38c of adjacent weft thread loops 14d. This interlacing 30d therefore
30 lies outside, beyond the connection points 38c of the weft thread loops 14d on the insertion side 18. On the discharge side 20, the interlacing 22d is formed by the interlacing thread 24c which is simultaneously drawn in each case through the head part 60 of the weft thread
35 loop 14d and the head part 76 of the loop 72 of the interlacing thread 34c and is interlaced with itself.

In the exemplary embodiments, the knitting needles are preferably latch needles, but other knitting needles, such as, in particular, compound needles may also be used.

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Many other design variants may also be envisaged, in particular the interlacings on the insertion side do not have to be identical to the interlacings on the discharge side, but different systems may be employed on both sides. At the same time, the weft threads may be of the multifilament type, but they are preferably of the monofilament type. By contrast, the interlacing threads are, as a rule, multifilament threads which by virtue of their flexibility can be adapted more easily to the interlacing patterns.

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LIST OF REFERENCE SYMBOLS

2	shedding device	32	thread guide
4	heddle	34	interlacing thread
6	warp thread	34a	interlacing thread
8	shed	34b	interlacing thread
10	axis	34c	interlacing thread
12	weft insertion needle	36	second knitting needle
12a	weft insertion needle	38	connection point
14	weft thread loop	38a	connection point
14a	weft thread loop	38b	connection point
14b	weft thread loop	38c	connection point
14c	weft thread loop	40	rocker
14d	weft thread loop	42	rocker
16	weft thread	44	shaft
16a	weft thread	46	shaft
16b	weft thread	47	axis of rotation
16c	weft thread	48	weaving reed
16d	weft thread	50	beating-up edge
18	insertion side	52	ribbon fabric
20	discharge side	52a	ribbon fabric
22	interlacing	52b	ribbon fabric
22a	interlacing	52c	ribbon fabric
22b	interlacing	52d	ribbon fabric
22c	interlacing	54	ribbon guide
22d	interlacing	56	stitch knocking-over plate
24	interlacing thread	58	stitch knocking-over plate
24a	interlacing thread	60	head part
24b	interlacing thread	62	second interlacing thread
24c	interlacing thread	64	second interlacing thread
24d	interlacing thread	66	thread guide
25	thread guide	68	thread placer
26	first knitting needle	70	eye

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28	loop	72	loop
30	interlacing	74	connection points
30a	interlacing	76	head part
30b	interlacing	78a	Heddle frame/heddle carrier rail
30c	interlacing	78b	Heddle frame/heddle carrier rail
30d	interlacing	78c	Heddle frame/heddle carrier rail

Patent claims

1. A needle-type ribbon weaving machine for producing a ribbon fabric, with a shedding device (2) forming a shed (8) and with a weft insertion needle (12, 12a) for at least one weft thread loop (14, 14a, 14b, 14c, 14d) and with a knitting needle (26) for securing the weft thread loop (14, 14a, 14b, 14c, 14d), said knitting needle being arranged on the discharge side (20) of the shed (8) facing away from the insertion side (18) of the weft insertion needle (12, 12a), a further second knitting needle (36) for interlacing (30, 30a, 30b, 30c, 30d) being arranged on the insertion side (18) of the weft insertion needle (12, 12a), characterized in that the knitting needles for the insertion side (18) and the discharge side (20) are arranged pivotable about the same axis of rotation (47).
2. The needle-type ribbon weaving machine as claimed in claim 1, characterized in that at least one interlacing thread (34c) can be introduced as a loop (72) into the shed (8) in parallel with the weft thread loop (14d).
3. A needle-type ribbon weaving machine as claimed in claim 2, characterized in that the weft insertion needle (12a) has a further guide eye (70) for the interlacing thread (34c) to be inserted as a loop (72).
4. A needle-type ribbon weaving machine as claimed in one of the claims 1 to 3, characterized in that at least one of the threads to be interlaced can be guided by means of a thread guide connected to the shedding device (78a, 78b, 78c), preferably to a heddle frame of the shedding device.

5. A needle-type ribbon weaving machine as claimed in one of claims 1 to 4, characterized in that the knitting needles (26, 36) of the insertion side (18) and of the discharge side (20) are arranged so as to
5 operate with a phase displacement of 90° to 270° , preferably of 180° .

6. A needle-type ribbon weaving machine as claimed in one of claims 1 to 5, characterized in that each
10 knitting needle (26, 36) is assigned a stitch knocking-over plate (56, 58).

7. The needle-type ribbon weaving machine as claimed in one of claims 1 to 6, characterized in that it has a
15 ribbon guide (54) which is assigned to the beating-up edge (50) and which extends at most over the entire width of the ribbon fabric (52, 52a, 52b, 52c, 52d) to be produced.

20 8. A ribbon fabric, produced by a needle-type ribbon weaving machine as claimed in one of claims 1 to 7, said ribbon fabric having weft thread loops (14, 14a, 14b, 14c, 14d) which are woven into warp threads (6) and which run over the entire width of the ribbon
25 fabric (52, 52a, 52b, 52c, 52d) and are tied up on the insertion side (18) and on the discharge side (20) facing away from the latter by means of interlacing (22, 22a, 22b, 22c, 22d, 30, 30a, 30b, 30c, 30d) with themselves and/or with at least one interlacing thread
30 (34, 34a, 34b, 34c, 64), characterized in that the weft thread (16, 16a, 16b, 16c, 16d) is a monofilament thread and the interlaced threads (24, 24a, 24b, 24c, 34, 34a, 34b, 34c, 62, 64) are multifilament threads.

35 9. The ribbon fabric as claimed in claim 8, characterized in that the interlacing (30, 30b, 30c, 30d) on the insertion side (18) is formed by an

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additional interlacing thread (34, 34a, 34b, 34c) between the connection points (38, 38b, 38c) of adjacent weft thread loops (14, 14b, 14c, 14d).

- 5 10. The ribbon fabric as claimed in claim 9, characterized in that it has on the insertion side (18) a further interlacing thread (64) which is interlaced with the first interlacing thread (34b).
- 10 11. The ribbon fabric as claimed in one of claims 8 to 10, characterized in that an interlacing thread (34c) is arranged as a loop (72) in the shed (8) in parallel with the weft thread loop (14d) and is interlaced on the discharge side (20).