

The invention relates to a mechanical loom according to the generic term of Claim 1.

It has already been known for a long time (DE-OS 1 535 330, US-PS 3 486 957, Textil-Praxis, September 1956, page 51) that tapes, particularly label tapes, can be manufactured on mechanical looms which produce relatively wide textiles, instead of on conventional mechanical ribbon looms, because by this means the production costs can be reduced to such an extent that the labels produced in this way are competitive with printed labels used for cheap textiles.

In theory, the manufacture of textile tapes by cutting up a woven textile run of corresponding width parallel to the warp yarn presents no difficulties. In practice, however, it is not possible to obtain a quality product economically in one operating cycle, due to shrinkage of the tapes caused by different warp yarn tensions and due to the furrowed separate edges.

In an attempt to overcome these disadvantages, an arrangement is described in DE-PS 2 302 949 or US-PS 3 961 650 which sees the solution to the problem in that all the devices which are already known, i.e. an expander, a cutting device and a thermal setting device, are compressed and incorporated in a massive, specially constructed, compact support beam which extends over the whole width of the textile. A very compact form of construction is achieved for this, but it does not eliminate the above-mentioned disadvantages, since the individual devices are rigidly disposed and their positions in relation to each other cannot be adjusted. The compact form of construction makes accessibility and operation difficult to a large extent, and moreover is susceptible to dirt due to the round rod of a clamp expander which is inserted in a narrow groove which is almost closed. This is because the woven textile run is drawn through this groove and

is clamped at the inlet and outlet slots, and thus sheds fluff and rolls up loose threads. A further significant disadvantage is that the unfavourable shrinkage behaviour and the furred separate edges of the tape cannot be removed with a resistance wire arranged on one side or underneath the tapes. For reasons of space, the compact form of construction permits no other solution; this means that the above-mentioned disadvantages are not even eliminated with this solution, and the tape quality demanded by the market still cannot be achieved.

Furthermore, a device is known from US-PS 4 124 420 which cuts up a wide woven textile into tapes. However, the device is an independent unit which is disposed downstream of a breast beam of a mechanical loom, and comprises a multiplicity of deflection rolls and a compensating device for maintaining a constant tape tension and tape speed at the cutting device. This device has the disadvantage that the guidance is adversely affected by the long path of the woven textile run, so that an accurate separation of the woven textile run into individual tapes according to the pattern cannot be ensured.

The object of this invention is to improve a mechanical loom of the type cited at the outset.

The stated object is achieved according to the invention by means of the characterising features of Claim 1. Because the guide device and the cutting device are disposed separated from each other on the mechanical loom, i.e. they are therefore not located on a common support, their accessibility is significantly improved, so that they are more easily accessible in the event of malfunctions and for adjustment operations. It follows that these individual devices can each be fashioned in the optimum way, due to their arrangement separate from each other, on the frame of the machine for example. Nevertheless, optimum guidance of the woven textile run, and thus accurate cutting according to the pattern, are achieved due to the close proximity of the cutting device to the guide device and thus to the weft yarn stop

edge. The setting device which is disposed downstream of the breast beam facilitates the optimum setting conditions, wherein the guidance of the individual tapes is no longer critical.

Advantageous forms of the mechanical loom are described in Claims 2 to 22.

The mechanical loom can have a system of deflecting rods according to Claim 15 as the guide device; however, a holding down device according to Claim 2 is more advantageous.

Because the woven textile run is simply guided in an S-shape around two guide edges of two guide rails, the resistance of the woven textile run in the guide device is relatively low, so that the woven textile run can be guided in both directions by the guide device. This results in a particularly simple construction of the guide device, which in practice is not susceptible to dust and is easily accessible for maintenance and setting operations. Nevertheless, the S-shaped guidance of the woven textile run provides adequate holding down and guidance of the woven textile run at the weft yarn stop edge, and uniformly smooth guidance for the cutting process, so that the optimum manufacturing conditions are achieved for the woven textile run or the tapes.

The arrangement according to Claim 3 facilitates a good adaptation of the guide rail to the woven textile run, and the arrangement according to Claim 4 facilitates a particularly subtle adjustment of the guide device, particularly in accordance with the type of woven textile run to be manufactured, e.g. its thickness.

Particularly good guidance properties are obtained with the arrangement of the guide device according to Claim 5. The first guide rail can fundamentally be disposed so that the woven textile run sits closely on this guide rail from below, so that the slot-shaped recess and the second guide rail are then disposed above the first guide rail. However, it is more

advantageous if the woven textile run lies on the first guide rail and is guided downwards into the slot-shaped recess, in which the second guide rail, which points in the direction opposite to the direction of travel of the woven textile run, engages. The adaptation of the second guide rail with its second guide edge to the type of woven textile run and to the production conditions can be improved by means of the arrangement according to Claims 6 or 7. The arrangement according to Claim 8, by means of which any clamping of the woven textile run on the guide device is adjustable, also has the same effect.

The arrangement according to Claim 9 is particularly advantageous, since the manufactured woven textile run can be subjected to a first setting process by means of the heating device.

The arrangement according to Claim 10 and/or 11 can be advantageous in order to give the woven textile run a desired shape. For this, a heating device provided at the guide edge and/or at the spreader rod can facilitate the setting of the aligned woven textile run. The alignment of the woven textile run at the spreader rod can be further promoted by means of the arrangement according to Claim 12, which is known *per se*. It is also possible that the spreader rod is disposed fixed according to Claim 13. However, a driven arrangement according to Claim 14 is also possible.

The arrangement of the cutting device according to Claim 16 is particularly advantageous. By means of the adjusting device, it is possible to adapt the cutting process to the weaving process, i.e. to the repeat length of a woven pattern in the woven textile run. When weaving labels, for example, the weaving rate and thus the take-off rate also, is slower during the weaving of the pattern than in the region between the patterns. The adjusting device then makes it possible to adjust the cutting heads to a position along the woven textile run such that they always cut

an unpatterned region if the rate of weaving and thus the take-off rate is greater than that in the unpatterned region.

A setting device according to Claim 17, which makes perfect setting of the manufactured tapes possible without significant changes in shape, is particularly advantageous. Due to the contact of the tapes with the rough surface of the roll, the tapes are prevented from being drawn in the longitudinal and in the transverse directions. For this, maintaining the true shape is assisted by the contact of the heated shoe. The rough surface of the roll can be obtained, for example, by adhesively bonding granular material to it, such as corundum powder, metal powder and the like. However, the arrangement according to Claim 18 is particularly advantageous, since the sprayed, fused metal powder is intimately bonded to the surface, and is therefore not adversely affected by the heating due to the heated shoe. Particularly good results are obtained with the arrangement according to Claims 19 and/or 20. The arrangement according to Claim 22 (sic) is also particularly advisable.

The arrangement according to Claim 22 is particularly advantageous, since the preheated roll facilitates setting, particularly for fast-running mechanical looms.

Examples of embodiments of the mechanical loom according to the invention will be described in more detail below by means of the schematic drawings, where:

Figure 1 is a side view of the guide for the woven textile run of a first mechanical loom;

Figure 2 is a side view of the guide for the woven textile run of a second mechanical loom;

Figure 3 shows a first guide device for the mechanical loom of Figure 2; and

Figure 4 shows a second guide device for the mechanical loom of Figure 2.

Figures 1 and 2 are schematic illustrations of the parts of the mechanical loom which are important to the present invention. All the remaining parts are from the state of the art and are sufficiently well known. The shed (4) formed from warp yarns (2) is shown, into which a weft yarn (5) is picked and looped on to the stop edge (8) of the woven textile run (10), in a manner which is not shown, by means of a weaving lath (6). The woven textile run first passes through a guide device (12a or 12b) which extends beyond the woven textile run (10). From the guide device (12a, 12b) the woven textile run (10) reaches the take-off device (14a, 14b), with a setting device (16a, 16b) which has a cutting device (18) disposed upstream of it. The guide device (12a, 12b), the cutting device (18) and the setting device (16a, 16b) are arranged independently on the frame of the mechanical loom at a distance from each other.

The cutting device (18) in turn is constructed in the known manner and contains various cutting heads (20) with cutting elements (22) which are individually adjusted transverse to the woven textile run, corresponding to the desired width of the tapes to be manufactured. The cutting heads may have electrically heated cutting wires or cutting blades. Cutting heads with ultrasonic cutting elements or laser cutting elements are also possible. In each case the cutting elements are constructed so that they not only facilitate the cutting of the woven textile run, i.e. in practice the severing of the weft yarns between two warp yarns, but at the same time also ensure that the cut edges are melted so that they are resistant to furrowing. For this, the woven textile run consists at least partially of thermoplastic yarn. In order to synchronise the cutting process with the pattern repeat, the cutting heads (20) are attached to a support (28) via adjusting spindles (26), and thus their position can be adjusted in the direction of the warp yarns, i.e. in the direction

of travel of the woven textile run. By this means it is possible to synchronise the cutting process with the pattern repeat of the woven textile run.

In the mechanical loom of Figure 1, the guide device (12a) is formed as a system of deflecting rods, wherein the woven textile run is guided round three fixed rods (32, 34, 36) attached to the frame (30) of the machine. At least one rod is constructed so that it can rotate, and at least one rod is constructed so that it can be heated, to facilitate the preliminary setting of the woven textile run.

As mentioned above, the take-off device (14a) of the mechanical loom of Figure 1 at the same time also contains the setting device (12a) for the manufactured tapes. For this, the take-off roll (38) is provided with a roughened surface, which is formed from metal powder which is sprayed on and melted, for example. The individual tapes are brought into contact with the take-off roll (38) via the guide roll on the input side, which serves as a breast beam (40), and the guide roll (42) on the exit side; these determine the run-on and run-off positions. A heated shoe (44), which can be advanced towards the take-off roll (38), acts together with the take-off roll (38), which likewise extends beyond the woven textile run, between the run-on and run-off positions of the cut woven textile run. This heated shoe is preferably located close to half the arc of contact (not shown) of the woven textile run and has a contact surface (46) which is adapted to the peripheral surface of the take-off roll (38). This heated shoe (44) is elastically attached to a feeder element (50) via springs (48), in order to achieve the optimum adaptation of the heated shoe (44) to the tapes lying on the take-off roll which are to be set. The feeder element (50) is attached to an adjusting device (52). The heated shoe (44) in turn can be equipped with electrical resistance heating, and with sensors and controllers for adjusting the requisite setting temperature, which is preferably at least 130°C. The adjusting device (52) can

also be attached to a control unit, in order to be able to adjust the prestressing force on the heated shoe (44).

The mechanical loom of Figure 2 differs from the mechanical loom of Figure 1 in that the guide device (12b) is constructed as a holding down device; this is explained in more detail in Figures 3 and 4, and below. Furthermore, the woven textile run is guided downstream of the cutting device (18) and upstream of the take-off device (14b) via a breast beam (54) formed as a plate, which takes over the function of the breast beam (40) in Figure 1. The take-off roll (38a) can preferably be heated to a temperature $< 100^{\circ}\text{C}$, in order to preheat the tapes to be set, and to speed up setting at the setting device (16b). The latter is advantageously constructed analogously to the setting device (16a) of Figure 1 and can be heated to a temperature $> 130^{\circ}\text{C}$. The setting device (16a) can act on the take-off roll (38a), as in Figure 1, or can act on the downstream guide roll (42), as in the example shown.

Figure 3 shows a first guide device (12b), constructed as a holding down device, at the weaving position of the mechanical loom. The warp yarns (2) are guided by means of a warp shedding device (not shown) so that the clear shed (4) is formed, through which the weft yarn (5) is picked and hooked on to the stop edge (8) of the woven textile run (10) by means of the weaving lath (6). The guide device (12b) contains a first guide rail (56), on the upper face of which the woven textile run (10) lies. The guide rail has a guide edge (60) which points in the direction of travel (58) of the woven textile run (10), by means of which the woven textile run is guided into a slot-like recess (62) below it. For this, the rounded guide edge (64) of a second guide rail (66), which feeds the woven textile run (10) into the recess (62), serves to guide the woven textile run in an S-shape. After the second guide edge (64), the woven textile run (10) is further transported over a spreader rod (68). The spreader rod (68) is located under the second guide rail (66), and is preferably provided with a left-hand thread on one half and a right-hand

thread on the other half, in the known manner which is not shown in detail, in order to tension the woven textile run in the direction transverse to the woven textile run. Corresponding screw thread undercuts may also be present on the first and/or the second guide edge (60, 64). The spreader rod (68) can be disposed stationary, as in the example shown, or can be driven. In the latter case the peripheral speed must be greater than the speed of production of the woven textile run. A drive in the opposite direction is also possible. However, in this example the spreader rod is stationary, and is secured to a support (72), which also supports the first guide rail (56), by means of a bolt (70). The second guide rail (66) is mounted on the spreader rod (68) so that it can pivot, wherein the axis (74) of the spreader rod, which also forms the pivoting axis of the second guide rail (66), is parallel to the guide edge (60) or (64). The second guide rail (66) is inclined at an acute angle (α) to the plane (76) of the woven textile run (10) at the stop edge (8), by means of which the clamping of the woven textile run (10) between the guide edges (60, 64) of the first guide rail (56) and the second guide rail (66) can be adjusted on drawing off the woven textile run.

The second guide rail (66) contains, at least in the region of the guide edge (64), a heating device (78) for setting the woven textile run, i.e. for stabilising the weft and/or the warp yarns. The heating effect can extend as far as the spreader rod (68) and can be assisted by an insulating cover (80) over the second guide rail (66). Under certain conditions the spreader rod may also be heated.

The guide device (12b) shown in Figure 4 corresponds to that of Figure 3, so that the same parts are denoted by the same reference numerals. In contrast to the guide device of Figure 3, the second guide rail (66a) of the guide device of Figure 4 is disposed on brackets (82) which are attached to the support (72). The brackets also support the spreader rod (68). The guide rail (66a) is adjustably guided on the brackets (82) in the direction

of travel (58) of the woven textile run by means of adjusting screws (84), so that the depth of overlap (x) of the successively engaging guide rails (66a, 60) is adjustable. The guide rail can be fixed by means of the positioning screw (86) within each depth of overlap (x) which is set. The second guide edge (64a) is fastened to the second guide rail (66a) by means of a resilient holder (88), so that the second guide edge (64a) can pivot about an axis (74a) determined by the fixing position (90).

Reference Numerals

α	Angle
x	Depth of overlap
2	Warp yarn
4	Shed
5	Weft yarn
6	Weaving lath
8	Stop edge
10	Woven textile run
12a	Guide device
12b	Guide device
14a	Take-off device
14b	Take-off device
16a	Setting device
16b	Setting device
18	Cutting device
20	Cutting head
22	Cutting element
24	Adjusting device
26	Spindle
28	Support
30	Frame of the machine
32	Rod
34	Rod
36	Rod
38	Take-off roll
38a	Take-off roll
40	Guide roll (breast beam)
42	Guide roll
44	Heated shoe
46	Contact surface
48	Springs
50	Feeder element
52	Adjusting device
54	Plate (breast beam)
56	First guide rail

58	Direction of travel of 10
60	Guide edge of 56
62	Recess
64	Guide edge of 66
64a	Guide edge of 66a
66	Second guide rail
66a	Guide rail
68	Spreader rod
70	Bolt
72	Support
74	Axis
74a	Axis
76	Plane
78	Heating device
80	Insulating cover
82	Bracket
84	Adjusting screw
86	Positioning screw
88	Resilient holder
90	Fixing position



Claims:

1. A mechanical loom, with a guide device (12a, 12b) for the woven textile run (10) arranged downstream of the weft yarn stop edge (8), with a cutting device (18) disposed between the guide device and a breast beam (40, 54), which cutting device is for cutting up a woven textile run (10) which at least partially comprises thermoplastic yarn into tapes and for melting the cut edges so that they are resistant to furrowing, and with a thermal setting device (16a, 16b), characterised in that the guide device (12a, 12b) and the cutting device (18) are each arranged independently of each other and that the setting device (16a, 16b) is disposed on a take-off roll (38, 38a) arranged downstream of the breast beam (40, 54) and/or on a directly following guide roll (42).
2. A mechanical loom according to Claim 1, characterised in that the guide device (12b) has a guide rail (56) with a guide edge (60), which guide rail extends over the width of the woven textile run (10) and which is disposed downstream of the weft yarn stop edge (8), with which a second guide rail (66, 66a) with a guide edge (64, 64a) is associated, with the guide rails engaging removably one behind the other, in such a way that the woven textile run (10) can be guided in an S-shape around the guide rails (56, 66, 66a).
3. A mechanical loom according to Claim 2, characterised in that the second guide rail (66, 66a) is formed from individual segments which catch hold of a part of the width of the woven textile.
4. A mechanical loom according to Claims 2 or 3, characterised in that the depth of overlap (x) of the successively engaging guide rails (56, 66a) is adjustable.



5. A mechanical loom according to any one of Claims 2 to 4, characterised in that a slot-shaped recess (62) exists above or preferably below the first guide rail (56) which points in the direction of travel (58) of the woven textile run (10), in which recess the second guide rail (66, 66a), which points in the direction opposite to the direction of travel (58) of the woven textile run (10), engages.
6. A mechanical loom according to any one of Claims 2 to 5, characterised in that the second guide edge (64) can be pivoted about an axis (74) which is parallel to the first guide edge (60).
7. A mechanical loom according to Claim 6, characterised in that the second guide edge (64a) is disposed on the guide rail (66a) by means of a resilient holder (88).
8. A mechanical loom according to any one of Claims 2 to 7, characterised in that the guide rail (66, 66a) is inclined at an acute angle (α) to the plane (76) of the woven textile run (10) at the weft yarn stop edge (8).
9. A mechanical loom according to any one of Claims 2 to 8, characterised in that the second guide rail (66, 66a) has a heating device (78), preferably in the region of the guide edge (64, 64a).
10. A mechanical loom according to any one of Claims 2 to 9, characterised in that the first and/or second guide edge(s) (60, 64, 64a) is/are constructed as a spreader device, wherein they have grooves on their deflection surfaces which stretch the woven textile run (10) in its transverse direction.
11. A mechanical loom according to any one of Claims 2 to 10, characterised in that a spreader device, preferably a



spreader rod (68), is disposed downstream of the guide edge (64, 64a) of the second guide rail (66, 66a).

12. A mechanical loom according to Claim 11, characterised in that the spreader rod (68) has a right-hand thread on one half and a left-hand thread on the other half.
13. A mechanical loom according to Claims 11 or 12, characterised in that the spreader rod (68) is disposed fixed.
14. A mechanical loom according to Claims 11 or 12, characterised in that the spreader rod (68) is arranged so that it can rotate and can preferably be driven at a peripheral speed which is greater than the speed of the product run (10).
15. A mechanical loom according to Claim 1, characterised in that the guide device (12) is formed as a system of deflecting rods, wherein three rods (32, 34, 36) are preferably provided which are attached fixed to the frame (30) of the machine, and that at least one rod is constructed so that it can rotate, and that preferably at least one rod can be heated.
16. A mechanical loom according to any one of Claims 1 to 15, characterised in that the cutting device (18) has cutting heads (20) which are disposed on an adjusting device (24) to facilitate adjustment of the position in the warp direction of the product run (10).
17. A mechanical loom according to any one of Claims 1 to 16, characterised in that the roll for the setting device (16a, 16b) is provided with a rough surface on which the cut



woven textile (10) run lies, wherein a heated shoe (44) can be guided towards the roll (38, 38a, 42).

18. A mechanical loom according to Claim 17, characterised in that the roll (38, 38a, 42) has a rough surface formed by spraying on and melting metal powder.
19. A mechanical loom according to Claim 17, characterised in that the heated shoe (44) has a contact surface (46) which is adapted to the peripheral surface of the roll (38, 38a, 42).
20. A mechanical loom according to Claim 17, characterised in that the heated shoe (44) is elastically disposed on a feeder element (50).
21. A mechanical loom according to Claim 17, characterised in that the heated shoe (44) is disposed between the run-on position and the run-off position of the cut woven textile run (10) on the roll (38, 38a, 42), preferably near the run-off position.
22. A mechanical loom according to any one of Claims 17 to 21, characterised in that the roll (38) can be heated to a temperature, preferably less than 100°C, which is less than the temperature of the heated shoe (44), where the latter temperature is preferably at least 130°C.