

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

Numerous mechanical needle ribbon looms of the type cited at the outset are known, from US-PS 3 064 689 and US-PS 3 901 285, for example. The wheel gear used for these comprises a bevel gear pair, wherein a bevel gear segment is disposed on a shaft which is attached to the lever mechanism. A second, smaller bevel wheel is mounted on the shaft which is attached to the weft needle. Angles of swivel of any desired magnitude can be produced with gearing such as this. However this gearing has the crucial disadvantage that only a few teeth are in mesh each time, so that it is subject to severe wear. This results in disadvantages comprising a short lifetime for the gearing, inaccurate running motion, and a high level of noise. Furthermore, such a bevel gear pair requires continuous lubrication with lubricants, so that it has to be accommodated in an appropriate housing.

Other mechanical needle ribbon looms are known from CH-PS 633 331 and WO 85/01524; these partly eliminate the disadvantages described above in that a wheel gear is dispensed with and the lever mechanism is guided as far as the shaft on which the weft needle is disposed. Such mechanical needle ribbon looms exhibit low wear, and thus have a long lifetime and are characterised by low noise and by accuracy. However, restrictions are imposed upon the swivelling motion of the weft needle, so that it can move through a maximum angle of 90°.

A weft needle drive mechanism for a mechanical needle ribbon loom is known from CH-A-633 330, for which at least one end of a transmission element is flexible transverse to the direction of transmission of force. This end of the transmission element is mounted on an oscillating member, eccentric to the axis of rotation. By suitably selecting the magnitude of the eccentricity, this weft needle drive mechanism makes it possible

to adapt or alter the angle of the swivelling motion to a value which is even greater than 90° . However it is disadvantageous that the transmission element can only transmit low compressive forces, and this weft needle drive mechanism is therefore unsuitable for large-scale industrial use.

The object of the invention is to develop a mechanical needle ribbon loom of the type cited at the outset so that large angles of swivel are possible at high load transmission.

This object is achieved according to the invention by means of the characterising features of Claim 1. Because the wheel gear is constructed as a chain transmission, belt transmission, or in particular as a toothed belt transmission, the application of a force is distributed over a greater number of teeth, by means of which the wear on such a transmission is significantly reduced. Furthermore, by coupling the lever mechanism to an eccentric bolt of the transmission via a coupling rod, a high load transmission is ensured. Moreover, lubricant problems are eliminated, particularly if a chain drive is used, since such transmission units can run dry; this results in a further significant simplification of the mechanical needle ribbon loom. Significantly greater drive capacities (greater than 1500 rpm, for example) can thus be achieved with a mechanical needle ribbon loom such as this. Nevertheless, this mechanical needle ribbon loom makes it possible to obtain a greater angle of swivel (120° , for example) of the weft needle, by means of which a shorter stroke can be selected for a weaving needle which ties the picked weft yarn loop. This results in better edge formation. The greater angle of swivel of the weft needle brings the weft yarn on the input side almost up to the textile stop edge. In this way the weft yarn is loaded less by the weaving reed, so that a textile of higher quality can be manufactured.

Advantageous forms of construction of the mechanical needle ribbon loom are described in Claims 2 to 4.

A further form of the mechanical needle ribbon loom according to Claim 2 is particularly advantageous; this results in a particularly simple tensioning device for the toothed belt, belt or chain of the drive mechanism.

Widely different angles of swivel of the weft needle can be set, depending on the transmission ratio and the adjustment of the wheel gear and of the lever mechanism. An arrangement according to Claim 3 is advantageous, however, with a swivelling motion of the weft needle from 80° to 180°, preferably 120°.

Widely differing forms of weft needles can be used; however a weft needle according to Claim 4 is advantageous.

The mechanical needle ribbon loom can have widely differing types of lever mechanisms, and in particular can also have those according to CH-PS 633 331 and WO 85/01524.

A schematic example of an embodiment of the mechanical needle ribbon loom according to the invention will be described in more detail below by means of the drawings, where:

Figure 1 is a side view of a mechanical needle ribbon loom; and

Figure 2 is a plan view of the mechanical needle ribbon loom of Figure 1, shown partially sectioned.

The mechanical needle ribbon loom shown schematically in Figures 1 and 2 contains a main drive shaft 2, to which a weft needle drive 4, a weaving lath drive 6, a weaving needle drive 8 and a shed drive 10 are attached. Warp yarns 12, the warp shed 14 and a woven ribbon 16 are also shown.

A disc 18 is disposed on the main drive shaft 2; this disc has a crank pin 22 which is guided so that it can be adjusted radially in a dovetail-shaped slot 20, so that the eccentricity of the crank pin is adjustable. A connecting rod 24 is attached

to the crank pin 22; this connecting rod is fastened to an oscillating lever 28, which is attached rotationally fixed to a shaft 30, by means of a swivel pin 28.

A longitudinal guide 32 disposed in the oscillating lever 28 serves for the adjustment of the effective lever length of the oscillating lever 28. Moreover, an arm 34, which carries a weaving lath 36 at its free end, is disposed rotationally fixed on the shaft 30.

Furthermore, an oscillating crank 38 is fastened rotationally fixed to the shaft 30 of the weaving lath drive 6. A coupling rod 40 is attached pivoted to this crank. This coupling rod in turn is attached pivoted to an oscillating crank 42 which is present on the weft needle drive 4. This oscillating crank 42 is attached rotationally fixed to a shaft 44, which carries a further oscillating crank 46, to which a further coupling rod 48 is attached, which forms the connection to a wheel gear 50 by means of which a vertical shaft 52 is connected. The upper end of the latter carries the weft needle 54 which engages in the warp shed 14.

The wheel gear 50 is constructed as a chain drive or preferably as a toothed belt drive. It has a large toothed wheel 56, which is mounted on an eccentric 58, which in turn is disposed so that it can pivot about its eccentric axis 60. The eccentric 58 can be locked in its position each time by means of a locking screw 62. The arrangement of the eccentric serves to tension a chain or preferably a toothed belt 64, which connects the large toothed wheel 56 to a small toothed wheel 66; the latter is mounted on the shaft 52 of the weft needle 54. The large toothed wheel 56 has an eccentric pin 68 to which the coupling rod 48 of the lever mechanism is attached. The restricted swivelling motion of the lever mechanism is transmitted by means of the wheel gear 50 in such a way that the weft needle can move through a large swivelling path, preferably of about 120°. In the example

illustrated, the weft needle has a forked head 70 for taking hold of and picking a weft yarn loop in the warp shed 14.

Figures 1 and 2 also show the weaving needle drive 8, which has a cam plate 74 disposed on the main drive shaft 2. A dog 76 on a double-arm oscillating lever 78 engages with this cam plate. A spring 80 presses the dog 76 on to the cam plate 74. A weaving needle 82 is fastened to the end of the oscillating lever 78 which is remote from the dog 76; this weaving needle engages in the known manner with one side of the ribbon to be manufactured and serves to tie the weft yarn loop 72, which is picked into the warp shed 14 by means of the weft needle 54.

The shed drive 10, which is also attached to the main drive shaft 2, contains a single-stage transmission 84. The latter is formed from a worm 86, which is attached to the main drive shaft 2, and from a worm wheel 88. The worm wheel is mounted on a secondary drive shaft 90, on which different eccentrics 92 are mounted; these drive shafts in the known manner, which is not shown in detail.

The connection of the weft needles to a lever mechanism shown in this example can also advantageously be used with other forms of construction of the lever mechanism, with those of CH-PS 633 331 and WO 85/01524, for example.

As a rule, mechanical needle ribbon looms have more than one weaving position, wherein each weaving position may possibly have two weft needles working opposite to each other which each traverse a part of the width of the woven textile run. A wheel gear of this type can be provided for each weft needle of such mechanical needle ribbon looms.



Claims:

1. A mechanical needle ribbon loom, in which a weft needle (54) is disposed on a shaft (52), wherein the shaft (52) is attached via a wheel gear (50) to a lever mechanism (24, 28, 38, 40, 42, 46), which is attached to an eccentric (22) of a drive shaft (2), characterised in that the wheel gear (50) is formed as a toothed belt-, chain- or belt transmission, wherein the lever mechanism is linked by means of a coupling rod (48) to an eccentric (68) of the toothed belt-, chain- or belt drive.
2. A mechanical needle ribbon loom according to Claim 1, characterised in that the toothed wheel (56) of the toothed belt-, chain- or belt transmission which is adjacent to the lever mechanism is mounted on an eccentric (58) which can pivot about its eccentric axis (60) and can be locked in any position.
3. A mechanical needle ribbon loom according to Claim 1, characterised in that the weft needle (54) executes a to and fro swivelling motion through 80 to 180°, preferably 120°.
4. A mechanical needle ribbon loom according to Claim 1, characterised in that the weft needle (54) has a forked head (70).