WEAVING MACHINE FOR TERRY CLOTH

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Field of Search 139/102, 103, 104, 101, 139/25-27, 353, 349

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ABSTRACT
The pile warp beam is placed below the ground warp beam and a tensioning beam is positioned to guide the pile warps into the weaving plane so that access can be made to the machine by moving the ground warps aside without pulling out the beat-up pile loops. A deflecting means also cooperates with the tensioning beam to guide the pile warps about 180° around the tensioning beam.

5 Claims, 1 Drawing Figure
WEAVING MACHINE FOR TERRY CLOTH

This invention relates to a weaving machine for terry cloth. Weaving machines for producing terry cloth or Turkish towelling have generally been supplied with the necessary ground warps and pile warps by means of two warp beams, one of which is wound with the ground warps and the other with the pile warps. Usually, the pile warp beam has been disposed above the ground warp beam while the ground warp beam has been mounted near the ground. This known arrangement has been used for obvious reasons, the ground fabric being produced in the manner which is conventional for most other kinds of woven fabric - i.e., for example, with a constant warp tension. In corresponding fashion, the basic construction of a weaving machine designed to weave ordinary fabrics has been retained insofar as the ground warps are concerned while an attachment has been added for the pile warp mechanism. Frequently, conventional weaving machines are changed over in individual cases to produce terry cloth. In such cases, some alterations are made in the machine drive and the pile warp attachments are added.

However, the above type of arrangement is disadvantageous for weaving machines of large working widths of e.g., about 2.8 meters, since the only way of gaining access to the warp end of such machines, for instance, to clear warp breakages or to work on the shafts, is by parting the downwardly supplied pile warps. Consequently, when the operator parts the pile warps in this way, the most recently formed pile loops are often pulled out of the ground fabric, or else, the pile warps which are shifted during the parting of the shed and which are tensioned more than the other pile warps suffer damage, with the risk of visible flaws in the finished cloth.

Since a pile warp beam requires frequent changing, for example from 5 to 10 times as much as the ground warp beam, depending upon weft density and the pile height of the finished product, another disadvantage arises. That is, the pile warp beam must be fitted and removed in an elevated position which is a nuisance, particularly, in the case of machines having large pile warp beams on which the windings may, for instance, be as much as 80 centimeters (cm) in diameter.

Accordingly, it is an object of the invention to provide a terry cloth weaving machine to which access can be had readily from the warp end without any risk of damaging the pile warps or the finished cloth.

It is another object of the invention to provide a terry cloth weaving machine to which pile warp beams can be fitted in a very simple manner.

It is another object of the invention to simplify the controls of a terry cloth weaving machine.

Briefly, the invention provides a terry cloth weaving machine having a predetermined weaving plane for weaving terry cloth having pile loops with a pile warp beam near the floor for supplying pile warps to a shed and a ground warp beam for supplying ground warps to the shed mounted above the pile warp beam and above the weaving plane.

This arrangement obviates the disadvantages of the previously known arrangement. That is, when warp breakages or other faults have to be dealt with, such as the removal of fluff balls from the warps, or when operator action is needed at the shafts, only the ground warps need be parted. As a result, there is no risk of pulling out the pile loops. Also, the pile warp beam, which has to be changed more often than the ground warp beam, is in the bottom position which is advantageous for conveyance and for fitting and dismantling.

That is, the pile warp beam is in the position which is conventional in ordinary weaving machines so that the available warp beam changing facilities, such as warp beam trucks, can be used.

In order to improve access to the machine part requiring supervision from the warp end, more particularly the warp stop motion, a tensioning beam is disposed below the ground warp beam and a deflecting means, such as, an extra deflecting or guide element is disposed between the pile warp beam and tensioning beam for that part of the ground warps which extend between the ground warp beam and the tensioning beam. This guide element is further disposed, as viewed from the warp end of the machine, closer to the shed than the tensioning beam and at a distance therefrom sufficient to at least provide an access space for entry to the machine shafts. Conveniently, the free space between the tensioning beam and the extra deflecting or guide element is approximately 20 centimeters (cm) or more. Thus, upon stepping of the weaving machine, access can be made to the detector slats of the warp stop motion by moving the ground warps aside between the tensioning beam and the deflecting means without pulling out the pile loops.

The extra deflecting or guide element can be disposed in a vertical position in which the ground warp paying-off position is disposed, together with the tensioning beam take-up position in the direction of warp movement, in a plane extending substantially parallel to the plane of that portion of the ground warps which are being paid off from the tensioning beam. This is a very useful feature for a terry cloth machine in which the cloth is shifted to form the pile loops and the tensioning beam makes a corresponding compensating motion since the tensioning beam, around which the ground warps extend in an angle of approximately 180°, is deflected only about half as much as the breast beam.

In order to simplify the control of the warp let-off facilities for the two warp beams, the ground-warp tensioning beam and a deflecting or guide means for the pile warp yarns disposed above the pile warp beam are disposed on support arms which are pivotable around a common pivot and which are coupled with the machine drive.

These and other objects and advantages of the invention will become more apparent from the following detailed description and appended claims taken in conjunction with the accompanying drawing in which:

The drawing illustrates a longitudinal sectional view through a weaving machine for terry cloth according to the invention with only the parts necessary for a description of the operation of the machine being shown.

Referring to the drawing, the terry cloth weaving machine has a frame (not shown) in which a pile warp beam 1 for supplying pile warps 11 is mounted along with a ground warp beam 2 for supplying ground warps 3. The ground warp beam 2 is mounted above the pile warp beam 1 in bearings (not shown). In addition, the frame has a deflecting means in the form of a rotatably mounted deflecting beam 4 around which the ground warps 3 pass to a horizontally movable tensioning beam 5 and thence after passing through an angle of about
180° to the shed in a weaving plane. As shown, the tensioning beam 5 is movable transversely of the ground warps 3.

The machine also includes two rows of detector slats 6, as are known, of a warp stop motion and through shafts 7 and a reed 8 for beating a weft yarn into a fell 9 where the fabric 10 to be produced begins. As shown, the ground warps pass through the slats 6, shafts 7 and reed 8. The pile warps 11 pass from the beam 1 via a guide means in the form of a compensating roller 12 and extend through two rows of detector slats 13 of a warp stop motion, through one eye each of heddles 14 disposed in two rows after the shafts 7, the heddles 14 being part of a Jacquard attachment 14a for shedding the pile warps, and finally through the reed 8 to the cloth edge or fell 9. The reed 8 is coupled with the machine drive in a suitable manner (not shown).

The warps 3, 11 are shown in the closed-shed position which corresponds to the horizontal weaving plane of the weaving machine. For shedding, the ground warps 3 are deflected vertically by the shafts 7 and the pile warps 11 are deflected vertically by the heddles 14. A shuttle (not shown) picks a weft yarn into the shed. After each pick, the reed 8 is pivoted by the machine drive from the solid-line position into the chain-line position 8′, the weft yarn being beaten up in the shed apex - i.e., at the edge 9, whereafter the warp yarns 3, 11 are tied in by another shed change.

The fabric 10 which starts at edge 9 passes below two temples 15 at the cloth edges and passes over a horizontally movable breast beam 16 connected by links 31 to the templates 15. Thereafter, the cloth 10 passes around a porcupine cloth take-up roller 17 and a deflecting roller 18 and is fed via a deflecting rod 19 to cloth beam 20 to be wound thereon.

The beam 5 and roller 12 are each disposed on a respective bent lever 21, 22 each of which levers 21, 22 is mounted for pivoting around a common pivot 23. The free arms of each lever 21, 22 is biased by a spring 25, 26, respectively, which is rigidly secured to the machine frame. The tensioning beam 5 is biased away from the shed by the spring 25 while the guide roller 12 is biased toward the shed by the spring 26. The levers 21, 22 are connected to the machine drive and are pivoted at the cadence of picking and in accordance with a predetermined programme against the force of the springs 25, 26, thus controlling the tensioning of the ground warps 3 and pile warps 11 and the let-off from the warp beams 2, 1, respectively.

In the embodiment shown, the range of movement of the reed 8 is constant so that beating-up always takes place in the reed position 8′. Breast beam 16 is controlled by the machine drive via a rod 27 and is so mounted on a pivot or spindle 32 as to be pivotable at a predetermined cadence, i.e., at the rhythm of the required full and partial beatings-up. The breast beam 16 and temples 15 are in the position shown for full beating-up and the picked weft is beaten up on the cloth edge 9. For partial beatings-up, the breast beam 16 is pivoted to the right from the position shown. Since the fabric 10 is retained near the roller 17, the cloth part engaged by the temples 15 is also moved to the right until edge 9 is about 1 or 2 centimeters (cm) away from the reed position 8′. The next weft picked is therefore moved towards the shed apex with a partial beating-up and remains at the distance just mentioned from the last fully-beaten-up weft.

Between the first and second and possibly after other partly beaten-up wefts, the pile warps 11 are so tied in and retained that, when the breast beam 16 and therefore the shed apex (the cloth edge 9) return to the position illustrated for full beating-up, the pile warps 11 together with the partly beaten-up wefts are pushed towards the cloth edge and upset, in contrast to the more strongly tensioned ground warps 3, thus forming the required pile loops.

Let-off from the ground warp beam 2 is controlled in known manner, the ground warps 2 being drawn off the ground warp beam 2 intermittently and at a constant tension. In shed changing and beating-up and in the movement described of the finished cloth 10, warp tension is kept constant by a pivoting movement of the beam 5 around the pivot 23.

The let-off from pile warp beam 1 is controlled similarly, the tensioning of the pile warps 11 being considerably less than the tensioning of the ground warps 3 to ensure that the pile loops are not pulled out of the fabric 10 formed at the fell 9.

The fact that the tensioning beam 5 and compensating roller 12 are mounted on coaxially pivotable bent levers 21, 22 makes it a very simple matter to control their compensating movements, the drive for which can therefore be readily derived from the machine drive and adapted, if necessary, to individual operating conditions.

A great advantage of arranging the beams 2, 4 in the manner described, insofar as weaving machines having a moving fabric 10 are concerned, is that the ground warps 3, which extend in an approximately 180° loop around the tensioning beam 5, act like a pulley block. Thus, the relatively large masses of the beam 5 need only be pivoted by about half the deflection of the breast beam 16 in order to adjust warp tension.

The deflecting beam 4 and tensioning beam 5 are disposed to leave a clear space of approximately 20 centimeters (cm) or more to form an access space in order to give ready manual access to the detector slats 6, 13, as well as to that part of the warps 3, 11 which are between the beam 5 and the shafts 7, from the warp end of the machine, by parting the group of ground warps 3. Thus, parting of the ground warps 3 entails substantially no risk of damaging the cloth 10. Also, the pile loops will not be pulled out.

The arrangement according to the invention is, of course, capable of use for other kinds of terry cloth weaving machines, for instance, those having a stationary breast beam where the pile loops are formed by appropriate control of the cloth take-up roller or of the reed, i.e., by displacement of beating-up or for non-Jacquard weaving machines in which the pile warps as well as the ground warps are guided by shafts. The pile warps 11 can be guided differently from the manner shown. For instance, instead of the roller 12, two supply rollers which cooperate in known manner can be used. In this case, the pile warps pass through between such rollers, so that the rollers provide the required tensioning of the pile warp. Also, the deflecting beam 4 can be disposed elsewhere in relation to the tensioning beam 5, for example, for improved access to the warp stop motion while the ground warps can extend around the beam 5 in a correspondingly different loop angle. Further, the extra deflecting beam can be omitted and the ground warps guided directly over the tensioning beam.
It has been found that the bearings of the two warp beams are loaded substantially equally in the arrangement according to the invention, since the forces resulting from the weight of the ground warp beam and from the tension of the ground warp yarns correspond substantially to the forces arising from the usually greater weight of the pile warp beam. The machine parts which bear the warp beams are therefore loaded more uniformly.

What is claimed is:

1. In a weaving machine for terry cloth having pile loops and woven in a predetermined weaving plane,
a pile warp beam for supplying pile warps to a shed;
a ground warp beam above said pile warp beam and the weaving plane for supplying ground warps to said shed;
a plurality of detector slats of a warp stop motion in the weaving plane for passage of the respective warps therethrough;
a tensioning beam disposed below said ground warp beam and above the weaving plane to guide the ground warps into the weaving plane, said tensioning beam being movable transversely of the ground warps; and
a deflecting means between said ground warp beam and said tensioning beam for guiding the ground warps therebetween, said deflecting means being positioned closer to said shed than said tensioning beam and being spaced from said tensioning beam to define an access space for manual entry to said detector slats whereby upon stopping of said weaving machine access can be made to said detector slats by moving the ground warps aside between said tensioning beam and said deflecting means without pulling out the pile loops.

2. In a weaving machine as set forth in claim 1 wherein said tensioning beam is pivotally mounted about a pivot point below said weaving plane and biased in a direction away from said shed and wherein said deflecting means cooperates with said tensioning beam for guiding the ground warps therebetween in a path substantially parallel to the weaving plane and which further includes a guide means disposed above said pile warp beam to guide the pile warps into said weaving plane, said guide means being pivotally mounted about said pivot point and biased in a direction towards said shed.

3. In a weaving machine as set forth in claim 1 wherein said deflecting means is spaced at least approximately 20 centimeters from said tensioning beam.

4. In a weaving machine as set forth in claim 1 wherein said deflecting means and said tensioning beam define a path for said ground warps substantially parallel to the path of said ground warps from said tensioning beam into said weaving plane.

5. In a weaving machine as set forth in claim 1, a guide means disposed above said pile warp beam to guide the pile warps into said weaving plane, said tensioning beam and said guide means each being pivotally mounted about a common pivot point and coupled to a drive of said machine to pivot in synchronism.

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO.: 3,910,317
DATED: October 7, 1975
INVENTOR(S): EBERHARD SEIFERT

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Abstract

Line 8, after "beam." insert --The deflecting means is spaced from the tensioning beam to provide an access space to the warp stop motion.--

Column 2, line 14, "pile" should be --ground--.

Column 2, line 21, after "machine shafts" insert --and detector slats of the warp stop motion--.

In the Abstract, lines 3 and 7, change "pile" to --ground--, respectively.

Signed and Sealed this thirteenth Day of April 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks