

PATENT SPECIFICATION (11)

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(54) IMPROVEMENTS IN NARROW FABRICS AND LOOMS FOR PRODUCING SAME

(71) We, BONAS MACHINE COMPANY LIMITED, a British Company, of Grangewood Hall, Netherseal, Burton-on-Trent, Staffordshire DE12 8BQ, and WILLIAM CHARLES ARNOLD, a British Subject, of 4 Mill Hill Drive, Winshall, Burton-on-Trent, Staffordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns narrow fabrics and looms for producing same.

It is known to produce narrow fabrics using more than one weft yarn and so dividing a warp sheet as to form superimposed sheds in order that a single weft is inserted into each shed. Such fabrics are often produced using a loom having a number of weft inserting needles or rapiers each one of which carries a loop of weft through one of the warp sheds. When such looms are used the loops of weft, at that edge of the fabric opposite to the edge at which the weft inserters enter the shed, are knitted either one through each other or are held in position by a catch thread which is knitted into a chain stitch along the edge of the fabric. In either case knitting is often carried out using a latch needle which reciprocates alongside the edge of the fabric. In the case in which a catch thread is used means must be provided to supply the thread at the requisite rate and at the requisite tension. In the case in which all of the weft loops are knitted together means must be provided to ensure that they are all positioned such that the latch needle hook can pass through all of the loops, and when two wefts are inserted simultaneously and knitted simultaneously the chain stitch formed tends to be bulky and thus the fabric is not acceptable for some uses.

It is therefore an object of the present invention to produce a fabric having more than one weft in which a knitted edge is formed without the need for a catch thread and in which some only of the weft loops are used to produce the knitted edge.

According to one aspect of the present

invention there is provided a loom having at least two weft laying means, means for producing superimposed warp sheds, and means for producing a knitted selvedge, said weft laying means being arranged to be moved simultaneously through the superimposed sheds from one side thereof and said means for producing the knitted selvedge being arranged to reciprocate towards and away from the shed forming means at the side thereof opposite to that from which the weft laying means are moved, characterised in that there is provided a weft diverter element adapted to move one weft into a position in which it can be received by the means for forming the knitted selvedge, said means being positioned to pass through a loop of the other weft or wefts without engagement therewith, whereby the knitted selvedge may be produced using one weft only, said knitted weft serving to retain the remaining unknitted loops of weft in position in the fabric.

According to a further aspect of the present aspect of the present invention a fabric including at least two wefts, when woven on a loom including a weft diverter element is characterised in that it is formed with a knitted selvedge formed from one weft only of the plurality of wefts laid therein.

The invention will now be described further, by way of example only, with reference to the accompanying drawings in which:—

Fig. 1 is a perspective view of part of a loom made in accordance with the invention,

Fig. 2 is a side elevation of the loom parts shown in Fig. 1, and

Fig. 3 is a plan view, drawn to a different scale, of the loom parts shown in Figs. 1 and 2.

As shown in the drawings a loom made in accordance with one form of the invention includes basically a reed 6, a pair of weft inserters 1 and 2, a latch needle 3 and a weft diverter 4. The weft inserts 1 and 2 are located forwardly (that is nearer to the front of the loom) of a plurality of heald frames (not shown) by means of which superimposed sheds can be formed. In the par-

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 ticular loom being described the sheds are formed by dividing a plurality of warp yarns 12 required for the production of a fabric 13 into three groups so that two sheds 10 and 11 are formed one above the other. The warp yarns of the three groups come together at a common fell line F.

Weft inserter 2 is used to carry a first weft 9 through shed 10 and weft inserter 1 which is nearer the heald frames) is used to carry a second weft 8 through shed 11. The latch needle 3 is mounted for reciprocation along-side that edge of the fabric 13 opposite to that at which the weft inserters 1 and 2 enter their respective sheds 10, 11. The weft inserters are arranged to move in unison into and out of their sheds and as can be seen the upper weft inserter 2 passes through its shed 10 nearer to the fell F than the lower weft inserter 1.

Mounted on the loom frame (not shown) is an oscillatable shaft 4a which carries weft diverter 4. The diverter is conveniently provided at its free end with a notch which serves to ensure that the weft 8 to be diverted is positively engaged by the devierter 4. As can be seen, particularly from Fig. 2, the notched end of the weft diverter 8 is positioned such that it lies between the weft inserters 1 and 2 when they are fully inserted in the sheds.

In operation both of the weft inserters 1 and 2 move in unison through their respective sheds to carry loops of weft 8 or 9 across the width of their sheds. At or near the end of the travel of the weft inserters 1, 2, the latch needle 3 is advanced to pass through the loop of weft 9 and below its weft inserter 2. Conveniently the weft inserter is notched on its underside to provide adequate clearance for the latch needle 3. As the latch needle 3 reaches or nears the end of its forward movement the diverter 4 is raised to contact the weft 8 (which locates in the diverter notch) and raise it into a position in which it can become located in the hook of the latch needle 3. The latch needle 3 now retracts through the loop of weft 9 without making contact with this weft, and so carries the weft 8 through the loop of weft 9. The diverter returns to its starting position and the weft inserters 1, 2 retract through the shed ready for the next pick.

As the latch needle continues its retraction the loop of weft 8 in the hook is drawn through the previous loop of weft 8 as the latter slides off the latch needle and closes the latch. During the next forward movement of the latch needle 3 the loop of weft 8 slides onto the shank of the latch needle, opening the latch so that the hook is now ready to receive the next loop of weft 8. Thus only the weft 8 is knitted, the chain stitches so formed being surrounded by the unknitted loops of weft 9. This means that

not only is the knitted selvedge relatively small but also that no catch thread is required for the production of the knitted selvedge.

WHAT WE CLAIM IS:—

1. A loom having at least two weft laying means, means for producing superimposed warp sheds, and means for producing a knitted selvedge, said weft laying means being arranged to be moved simultaneously through the superimposed sheds from one side thereof, and said means for producing a knitted selvedge being arranged to reciprocate towards and away from the shed forming means at the side opposite to that from which the weft laying means are moved, characterised in that there is provided a weft diverter element adapted to move one weft into a position in which it can be received by the means for forming the knitted selvedge, said means being positioned to pass through a loop of the other weft or wefts without engagement therewith, whereby the knitted selvedge may be produced using one weft only, said knitted weft serving to retain the remaining unknitted loops of weft in position in the fabric.

2. A loom as claimed in claim 1, in which the means for producing a knitted selvedge is a latch needle.

3. A loom as claimed in claim 1 in which the means for producing superimposed sheds comprises a plurality of heald frames.

4. A loom as claimed in claim 1 in which the weft diverter element is in the form of a notched bar, the notch thereof being located at the free end of the bar.

5. A loom as claimed in claim 1 or 4 in which the weft diverter element is mounted on an oscillatable shaft.

6. A loom as claimed in claim 1 in which there are two weft laying means arranged in parallel spaced relationship forwardly relative to the means for producing the sheds, that weft laying means nearer the means for producing the sheds being located at a level below the other weft laying means, the weft diverter element being positioned between the weft laying means and movable to a position adjacent the means for producing the knitted selvedge.

7. A loom as claimed in claim 6 in which the weft laying means remote from the reed is notched to provide clearance for passage of the means for producing the knitted selvedge.

8. The method of producing a woven fabric on a loom as claimed in any one of the preceding claims including the steps of shedding a plurality of warp yarns to produce superimposed sheds, simultaneously inserting a weft inserting means into each of the sheds to introduce weft loops into the sheds, inserting a means for producing a knitted selvedge

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 ticular loom being described the sheds are formed by dividing a plurality of warp yarns 12 required for the production of a fabric 13 into three groups so that two sheds 10 and 11 are formed one above the other. The warp yarns of the three groups come together at a common fell line F.

Weft inserter 2 is used to carry a first weft 9 through shed 10 and weft inserter 1 which is nearer the heald frames) is used to carry a second weft 8 through shed 11. The latch needle 3 is mounted for reciprocation alongside that edge of the fabric 13 opposite to that at which the weft inserters 1 and 2 enter their respective sheds 10, 11. The weft inserters are arranged to move in unison into and out of their sheds and as can be seen the upper weft inserter 2 passes through its shed 10 nearer to the fell F than the lower weft inserter 1.

Mounted on the loom frame (not shown) is an oscillatable shaft 4a which carries weft diverter 4. The diverter is conveniently provided at its free end with a notch which serves to ensure that the weft 8 to be diverted is positively engaged by the diverter 4. As can be seen, particularly from Fig. 2, the notched end of the weft diverter 8 is positioned such that it lies between the weft inserters 1 and 2 when they are fully inserted in the sheds.

In operation both of the weft inserters 1 and 2 move in unison through their respective sheds to carry loops of weft 8 or 9 across the width of their sheds. At or near the end of the travel of the weft inserters 1, 2, the latch needle 3 is advanced to pass through the loop of weft 9 and below its weft inserter 2. Conveniently the weft inserter is notched on its underside to provide adequate clearance for the latch needle 3. As the latch needle 3 reaches or nears the end of its forward movement the diverter 4 is raised to contact the weft 8 (which locates in the diverter notch) and raise it into a position in which it can become located in the hook of the latch needle 3. The latch needle 3 now retracts through the loop of weft 9 without making contact with this weft, and so carries the weft 8 through the loop of weft 9. The diverter returns to its starting position and the weft inserters 1, 2 retract through the shed ready for the next pick.

As the latch needle continues its retraction the loop of weft 8 in the hook is drawn through the previous loop of weft 8 as the latter slides off the latch needle and closes the latch. During the next forward movement of the latch needle 3 the loop of weft 8 slides onto the shank of the latch needle, opening the latch so that the hook is now ready to receive the next loop of weft 8. Thus only the weft 8 is knitted, the chain stitches so formed being surrounded by the unknitted loops of weft 9. This means that

not only is the knitted selvedge relatively small but also that no catch thread is required for the production of the knitted selvedge.

WHAT WE CLAIM IS:—

1. A loom having at least two weft laying means, means for producing superimposed warp sheds, and means for producing a knitted selvedge, said weft laying means being arranged to be moved simultaneously through the superimposed sheds from one side thereof, and said means for producing a knitted selvedge being arranged to reciprocate towards and away from the shed forming means at the side opposite to that from which the weft laying means are moved, characterised in that there is provided a weft diverter element adapted to move one weft into a position in which it can be received by the means for forming the knitted selvedge, said means being positioned to pass through a loop of the other weft or wefts without engagement therewith, whereby the knitted selvedge may be produced using one weft only, said knitted weft serving to retain the remaining unknitted loops of weft in position in the fabric.

2. A loom as claimed in claim 1, in which the means for producing a knitted selvedge is a latch needle.

3. A loom as claimed in claim 1 in which the means for producing superimposed sheds comprises a plurality of heald frames.

4. A loom as claimed in claim 1 in which the weft diverter element is in the form of a notched bar, the notch thereof being located at the free end of the bar.

5. A loom as claimed in claim 1 or 4 in which the weft diverter element is mounted on an oscillatable shaft.

6. A loom as claimed in claim 1 in which there are two weft laying means arranged in parallel spaced relationship forwardly relative to the means for producing the sheds, that weft laying means nearer the means for producing the sheds being located at a level below the other weft laying means, the weft diverter element being positioned between the weft laying means and movable to a position adjacent the means for producing the knitted selvedge.

7. A loom as claimed in claim 6 in which the weft laying means remote from the reed is notched to provide clearance for passage of the means for producing the knitted selvedge.

8. The method of producing a woven fabric on a loom as claimed in any one of the preceding claims including the steps of shedding a plurality of warp yarns to produce superimposed sheds, simultaneously inserting a weft inserting means into each of the sheds to introduce weft loops into the sheds, inserting a means for producing a knitted selvedge

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- through at least one loop of weft, moving a weft diverter into contact with one part of that loop of weft nearest a reed to engage that weft with the means for producing the knitted selvedge, retracting the means for producing the knitted selvedge to draw a loop of weft through the loop or loops of weft inserted by the other weft inserter or inserters to produce a knitted chain stitch using one weft only, beating up the inserted loops of weft with the reed and repeating the cycle of operations to produce a fabric having at least two wefts one only of which is knitted.
9. A fabric including at least two wefts when woven using a loom as claimed in any one of claims 1 to 7, characterised in that it is formed with a knitted sevedge formed

from one weft only of the plurality of wefts laid therein.

10. A loom substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

11. A method of weaving a fabric substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

12. A fabric when woven on a loom substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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Agents for the Applicants,
WILSON, GUNN & ELLIS,
45—51 Royal Exchange,
Cross Street,
Manchester, M2 7DB.