

May 30, 1961

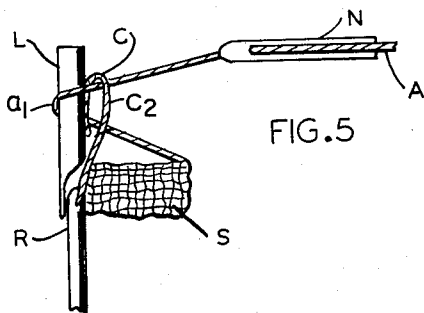
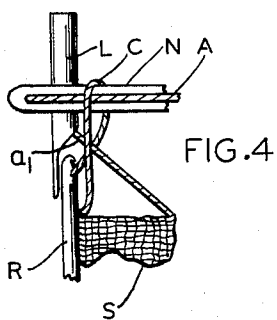
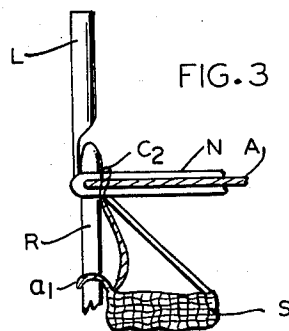
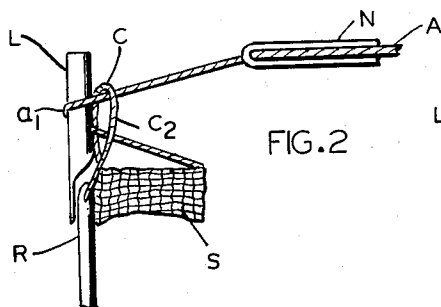
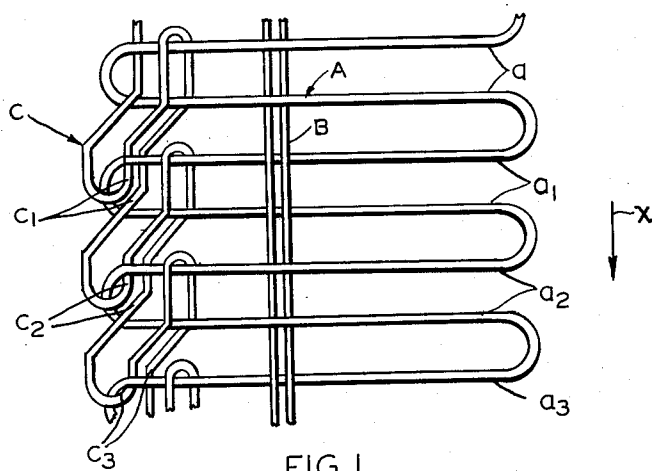
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2,986,171

NARROW FABRIC MANUFACTURE

Filed Oct. 21, 1957

2 Sheets-Sheet 1



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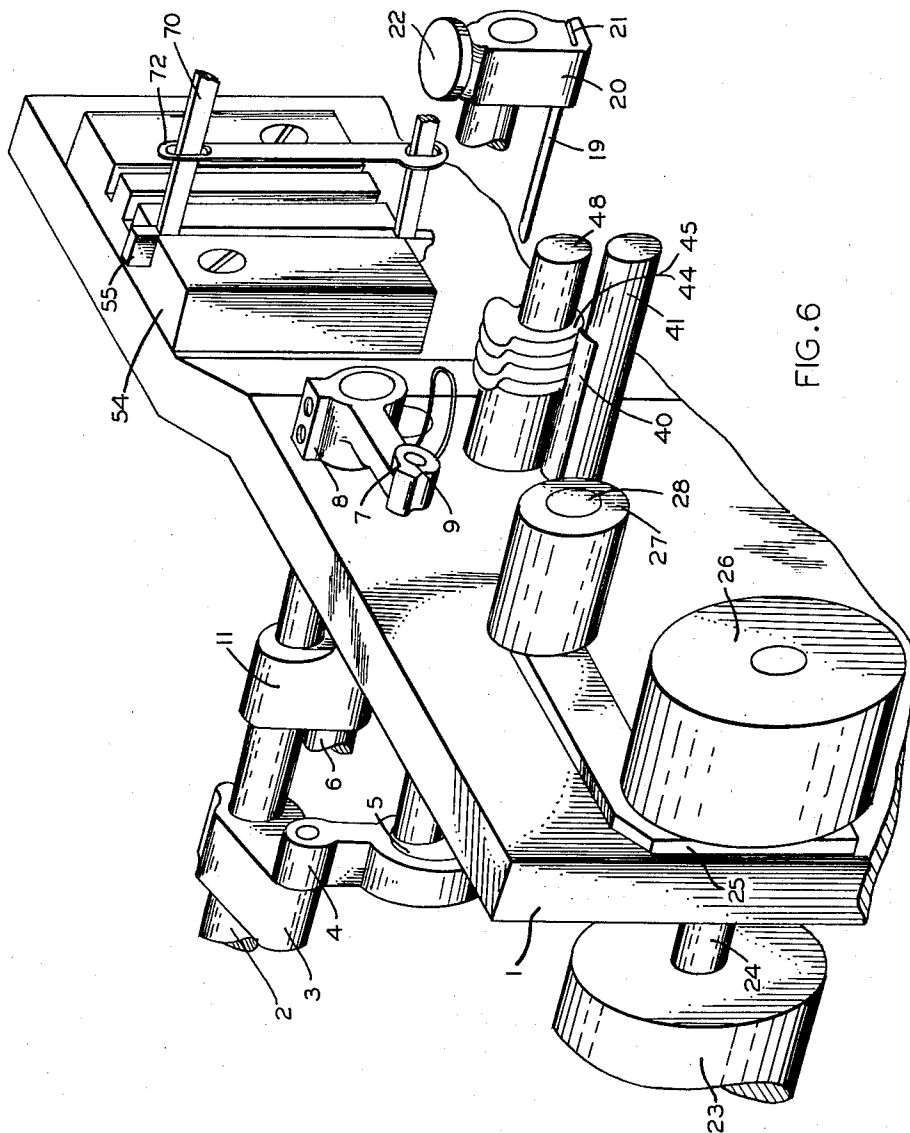


FIG. 6

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2,986,171

NARROW FABRIC MANUFACTURE

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3 Claims. (Cl. 139—124)

This invention relates to narrow fabric and more particularly to a narrow fabric having a special selvage, and to a method and apparatus for making this fabric.

More specifically, the method is performed in a loom which double shot wefts are inserted in pairs through the warps by a weft needle, as for example, shown in United States Patent 2,537,158. This type of method eliminates the use of shuttles which are commonly employed to pass a line of selvage thread through the looped ends of weft.

The fabric, according to the present invention, includes a locking yarn which is formed into loops and passes through a first weft loop, then through a subsequent weft loop and back over the first weft loop then back again through the subsequent weft loop, and so on. According to this structure the locking yarn always passes twice through each weft loop. This has the effect of forming a selvage which will not run. That is to say that when the selvage is cut through and the fabric pulled from the end, the fabric will not unravel.

Formation of this fabric is accomplished by a method according to the invention in which a weft loop is passed through the warp shed, a locking thread loop, which has been passed through a preceding weft loop, is looped around the weft loop, and then while the weft loop is being held outside the shed a second locking thread loop is passed through it to a position to be looped around the next following weft loop to be passed through the shed. An apparatus suitable for carrying out this method employs a needle for passing the weft loops through the shed, a needle for the looping thread, and a looper which moves with the needle. The movements of the weft needle are synchronized with those of the locking thread needle and looper in such a way that the method above described is carried out.

The invention has thus been generally described and it will now be referred to in more detail by reference to the accompanying drawings which show preferred embodiments and in which:

Figure 1 is an enlarged diagram showing how the weft loops are bound by the locking thread.

Figures 2-5 are diagrams showing the operation of the weft laying needle and the locking thread needle and looper at various stages of forming the fabric.

Figure 6 is a fragmentary perspective view showing the functional parts of a preferred type of loom capable of carrying out the method of the invention.

Referring in more detail to Figure 1 of the drawings, wherein the arrow X indicates the direction of travel of the material, A represents the weft thread which is formed into loops, a_1 , a_2 , a_3 , etc., deposited in the shed of the warp threads B from one side thereof. C is the special locking thread which is formed into loops C_1 , C_2 , C_3 , etc., which lock loops of the weft thread to form the selvage.

According to the invention, the loop C_2 of locking thread passes through the loop a_2 of weft thread and thereafter is looped around the following loop a_1 of weft thread, this sequence being continued with the loop C_1 of

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locking thread being passed through the loop a_1 of weft thread then around the next following loop of weft thread, and so on.

The locking thread is locked with the loops of the weft thread A in such a manner that if the fabric is cut through the selvage thus formed, it cannot unravel. This is because a loop of the locking thread passes through each loop of the weft thread and then around the following loop of weft thread, thereby causing the locking thread to pass twice through each weft thread loop.

The formation of narrow fabric of this type is performed by a method according to the invention. This method is best illustrated in Figures 2 to 5.

The back and forth movement of the looper L and the needle R parallel to the selvage in the warp will in turn transfer the locking end A on to the needle R from which it will be released at the next cycle. In this manner it always holds the edge with one loop of weft yarn and makes a fine straight selvage. The method of forming the fabric will be described below in more detail.

A preferred mechanism of the invention which will be used to carry out the method and to make the fabric as described may be best understood by reference to Figure 6.

This figure shows a main support 1 as part of a housing which will enclose all moving parts and provide a constant lubrication for them. The loom includes the usual shed changing mechanism (not shown) which will move the harnesses 55 with cross bar 70 and heddle 72.

The main shaft 48 which is connected to the cam shaft (not shown) will carry the eccentric 5 and 82 (not shown) for the take-up motion 23 and the cam or eccentric 30 (not shown) for shaft 6. The shaft 6 moving rapidly back and forth, guided by slide 11 and bearing in plate 1 moves the needle carrier 20 with clamp screw 22, needle 19 and thread guide 21 through the shed and over the needle R. The needle R receives its rocking motion from the eccentric 5 over the eccentric housing 4, connector 3 and shaft 2. The needle R may be curved or straight and the looper L may be curved or straight. If the needle R is straight it will move back and forth. If curved it will pivot. The clamp 7 with nut 9 will hold needle R and looper L in the proper position.

Rotary reed dents 44 with spacers 45 on main shaft 48 will beat the filling against the breast beam 40 on the bolt 41.

The movements of the needles and the looper as shown in the drawings are synchronized with the rotation of the reed which is not shown. An extra reed is provided between the harnesses 55 and rotary reed 44 to keep the warp yarn in position.

The opposite selvage is formed either with an edge wire or single warp thread. Actually the single warp thread is preferred and the edge wire can be eliminated.

The take-up motion includes an eccentric and a rocking arm with its pivoting point moveable to provide for picks from 10 up to 100 (not shown).

The take-up motion 23 on the shaft 24 driving a knurled transport roll 26 includes two sets of non-reversing roller clutches joined together with two pins which in turn release the transport roll 26 when disconnected. One set of the roller clutches acts as transport while the other prevents it from moving backward. An eccentric and rocking arm, pivoting around a moveable center will vary the stroke on its other end which transmits its movement onto the take-up motion 23 thus varying the number of picks per inch on the roll 26. A rubberized press-roll connected with the arm 25 to the tension roll 27 will by increased tension also increase its pressure on transport roll 26 preventing the web from slipping back. When the clutches are disconnected by

means of the two pins mentioned above, the transport roll 26 can be easily moved in either direction.

For high speeds, guides and take-up members are provided to take up the slack of the weft yarn and the locking end.

The moving parts of the loom are driven by a power input pulley connected by a belt to a convenient power source (not shown). The pulley is mounted on the cam shaft and will drive, with a pair of change gears, the main shaft 48. The location of the shafts might vary for the purpose of driving the needle assembly 19-22 by cam or eccentric and for introducing a straight needle and looper instead of the curved needle R and looper L as shown in Fig. 6.

Operation

The operation of the apparatus and the carrying out of the method of the invention will be best understood by reference to Figures 2 to 5.

Figure 2 shows the loop a_1 of the weft yarn A passed through the loop C_2 of the locking thread C and thrown over the looper L (Fig. 2). In Figure 3 there is shown the loop a_1 of the weft yarn A from Figure 2 transferred from the looper L onto the needle R. Figure 4 shows the needle N laying the loop a_1 of weft yarn around the looper L prior to loop a_1 being transferred to the needle R as shown in Fig. 3. In Figure 5 the needle N is shown giving way for the rotating reed to beat up the filling against the breast beam 40 and change the shed prior to the loop a_1 of weft thread being transferred to needle R. Thereafter, as the needle N carries the next following loop of weft thread through the shed, the loop a_1 is dropped by the needle R and the cycle is repeated.

It should be noted that a reciprocating beating-up member can be used instead of a rotary member. Various types of weaves can be made as will be understood by one skilled in the art. Different types of fiber may be employed including natural fiber, for example cotton or silk or synthetic fiber for example nylon, orlon and so on. The yarns may be nonelastic or elastic. The size of the yarn may vary widely to form narrow fabrics of various widths and strengths.

I claim:

1. A narrow woven fabric comprising warp yarn, with weft yarn forming loops running back and forth across the fabric in a textile weave and a locking yarn locking the weft loops to form a selvage at one edge of the fabric, said locking yarn being formed into consecutive loops, each locking yarn loop passing through a first weft loop then around a subsequent weft loop, with a subsequent locking yarn loop passing through the subsequent weft loop and around a next subsequent weft loop, whereby one locking yarn loop passes through each weft loop and one locking yarn loop passes around each weft loop.

2. A narrow woven fabric comprising warp yarn, with weft yarn forming loops running back and forth across the fabric in a textile weave and a locking yarn locking the weft loops to form a selvage at one edge of the fabric, said locking yarn being formed into consecutive loops, corresponding in number to the number of weft loops, each locking yarn loop passing through a first weft loop and thereafter around the next following weft loop.

3. A method of weaving a narrow fabric including warp thread, weft thread and a locking thread and forming a selvage on the fabric comprising forming a warp shed, forming a locking thread loop adjacent an edge of said shed, depositing a weft thread loop in said shed and simultaneously passing said weft thread loop through said locking thread loop, and forming a subsequent locking thread loop and passing it through said weft thread loop and around a subsequent weft thread loop deposited in a subsequent warp shed from the same side as said first weft thread loop.

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