United States Patent

[11] **3,540,492**

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[33] **Switzerland**
[31] **3,733/66**

[54] **METHOD AND APPARATUS FOR WEAVING**
5 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **139/116,** 66/125, 139/126
[51] **Int. Cl.** **D03d 47/00**
[50] **Field of Search** 139/122, 1, 127, 11, 116; 28/72A3, 72A; 66/125, 125A, 132, 134

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ABSTRACT: There is disclosed a method of weaving in which the weft yarn storage is maintained outside the shed, the weft yarn being pulled through the shed in the picking operation, as by means of gripper-type shuttles, and in which more particularly the weft yarn is pulled from a knitted fabric stored outside the shed, the fabric unraveling in response to pull of the weft yarn therefrom in order to supply the length of weft yarn necessary for the pick. There is additionally disclosed a weft yarn supply in the form of a knitted fabric having the shape of a strip, and preferably of a tube, folded or wound into a package. There is also disclosed a loom suitable to practice of this method, including means for storage of the weft yarn supply outside the shed, and preferably including a weight such as a ball, placed inside the tubular fabric, to control disposition of the fabric as it unravels for supply of the weft yarn.

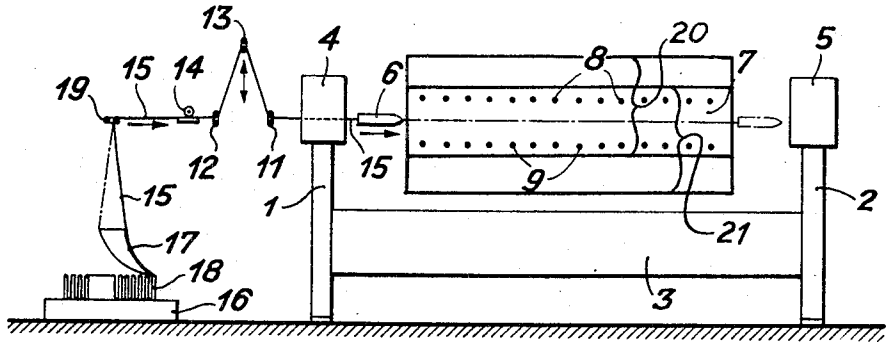


Fig. 1

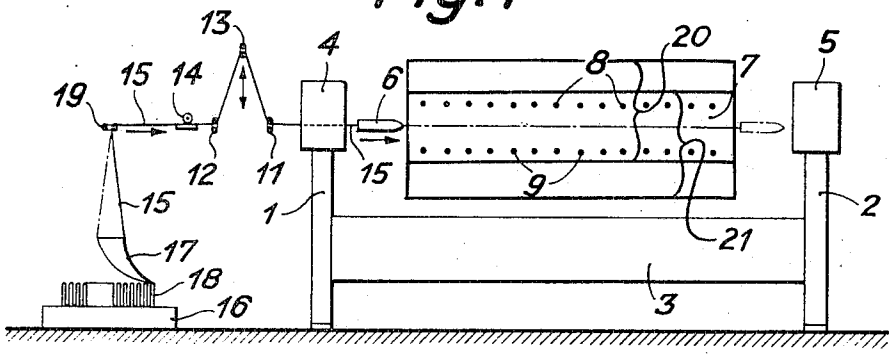
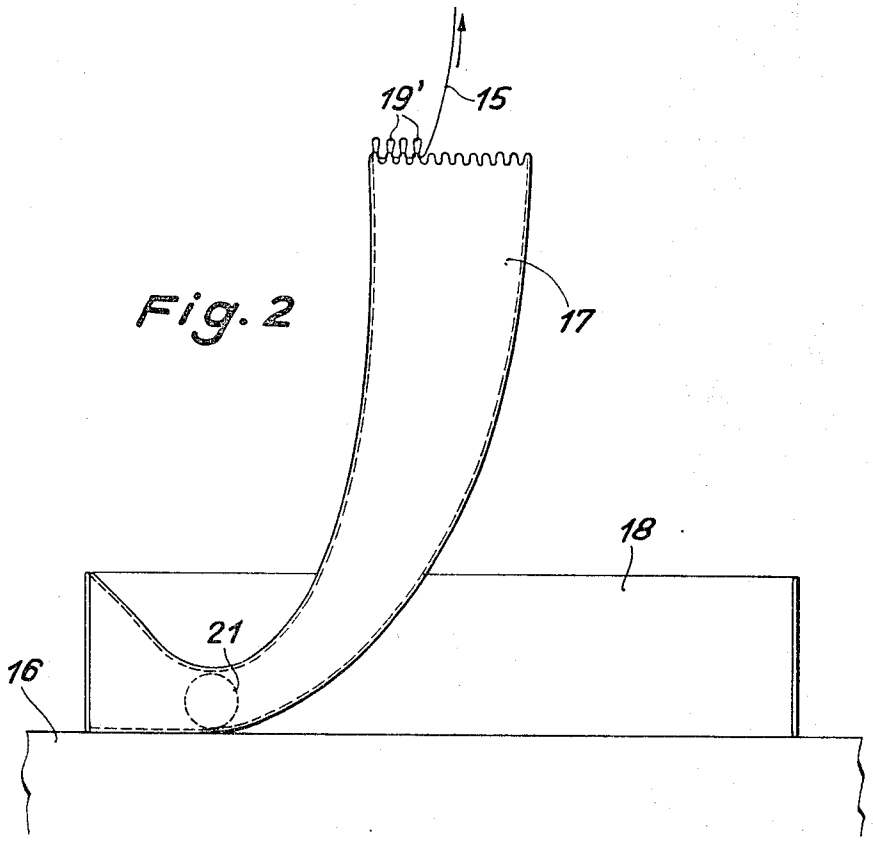


Fig. 2



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METHOD AND APPARATUS FOR WEAVING

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to weaving methods and apparatus in which the weft thread supply remains outside the shed instead of being carried through the shed on a pirn inside a shuttle

2. Description of the Prior Art

In looms heretofore proposed having weft thread or yarn storage outside the shed, the weft yarn is pulled from a bobbin or bobbins maintained outside the shed, and the diameter of the mass of thread on that bobbin declines as weft thread is withdrawn therefrom. Consequently, the pulloff resistance of the yarn, *i.e.* the effort which must be expended in pulling the yarn off the bobbin, also varies with the amount of thread on that bobbin.

SUMMARY OF THE INVENTION

It is an object of the invention to achieve a constant weft thread pulloff resistance throughout the weaving operation. In accordance with the method of the invention, a knitted material is used for the supply of the weft thread or yarn, and the weft yarn is obtained from this fabric by unraveling thereof consequent on pulling of the end of the weft yarn through the shed, as by means of a gripper shuttle. The pulloff resistance of the weft yarn consequently does not depend on nor vary with the diameter of the quantity of thread instantaneously present on a bobbin. The pulloff resistance of the weft yarn from the knitted material which is experienced in practice of the invention is small, and is moreover constant, and as experience has shown it is well adapted for satisfactory performance of the picking or weft thread insertion operation. A weft thread balloon such as appears when the weft thread is pulled off a bobbin does not occur with the invention. The weft thread is therefore not subjected to any centrifugal force and is hence subjected to less stress, so that the number of weft thread breakages is reduced.

In one embodiment of the invention, the knitted weft thread supply fabric includes synthetic fibers which have accordingly been set or crimped, into the shape occupied by them in that fabric, so that a textured yarn is obtained on unraveling of that fabric. The textured or crimped nature of the synthetic yarn arises from the tendency of the weft yarn to retain the wavy shape occupied by it in the knitted fabric, into which shape it may moreover have been set by heating or chemical treatment of that fabric.

In a preferred exemplary embodiment, the weft thread storage fabric is tubular in shape, wound or folded into a package or ball. In place thereof it may have the shape of a strip wound up into a coil. The invention further provides a loom including means to shed a plurality of warp yarns, means to pull a weft yarn or yarns through the shed, and means to support a knitted fabric as a weft yarn supply outside the shed. In a preferred embodiment, the loom includes a weight, such as a ball, which may be inserted into the fabric when of tubular shape so as to prevent unfolding of the fabric instead of unraveling thereof.

BRIEF DESCRIPTION OF THE DRAWING

The invention will now be further described with reference to the accompanying drawings in which:

FIG. 1 is a diagrammatic representation of a gripper shuttle loom according to the invention and with which the invention may be practiced; and

FIG. 2 shows a detail from FIG. 1.

DESCRIPTION OF PREFERRED PRACTICE AND EMBODIMENTS

Referring to FIG. 1, the loom there diagrammatically shown includes uprights 1 and 2 on opposite sides of the loom, joined by a horizontal support member 3. The upright 1 supports a picking mechanism 4 and the upright 2 supports a catching mechanism 5 for gripper shuttles of which one is shown at 6. These shuttles are shot from the picking mechanism through the shed indicated at 7 and are received in the catcher 5. The loom includes apparatus, which may be conventional in nature, for forming warp threads 8 and 9 into a shed, threads 8 being those instantaneously in the upper shed and threads 9 being those instantaneously in the lower shed. Specifically there is shown in FIG. 1 a heddle frame 20 controlling the warp yarns 8 and a heddle frame 21 controlling the warp yarns 9. The frames are reciprocated upward and downward in opposite phases and in timed relation with the operation of the picking mechanism 4 in a manner which may be conventional, drive being supplied for example from a main loom shaft, not shown.

The loom further includes stationary eyes 11 and 12, a vertically reciprocating thread tensioning device 13, and a thread brake 14 through which the weft yarn 15 is threaded.

At the picking side of the loom there is provided a support 16 on which is disposed a package 18 of fabric 17, preferably knitted into a tubular shape. The weft yarn 15 is pulled off of this fabric to an eye 19 and then through the parts of the loom already described to the gripper shuttle 6 by which it is pulled through the shed.

The individual meshes or stitches 19' of the fabric are seen in FIG. 2 at the pulloff end of the weft thread package 18. These meshes are unraveled by pulloff of the yarn 15 during picking. At the lower end of the portion 17 of the package there may be provided a ball or sphere 21 which weights the yarn package. As the tubular fabric 17 is consumed by unraveling of the thread thereof in the picking process, the ball 21 will roll slowly to the left in FIG. 2 and thereafter back to the right, successive folds of the yarn package 18 being thus consumed.

In a modified embodiment, the fabric for the weft yarn supply is of strip shape rather than tubular shape, and again advantageously formed into a ball or package. Optionally a plurality of weft yarns may be withdrawn simultaneously from the weft storage material and picked together by the same shuttle 6 through the shed 7.

The knitted weft thread supply may be made partly or wholly of synthetic yarns or synthetic fibers. It is then possible to crimp the yarn while in the fabric 17, by heat or chemical action, so that it tends to retain, after being pulled out therefrom, the wavy shape which it had in its meshes in the fabric. The weft yarn thus obtained by unraveling of this fabric will contain a texture which will appear in the finished, woven cloth.

If plural yarns are withdrawn simultaneously from the weft package, they may be of various types and colors and may be simultaneously picked into the cloth.

While the present invention has been described herein in terms of a presently preferred embodiment of the apparatus thereof and in terms of the presently preferred practice of the method thereof, the invention itself is not limited thereto but rather comprises all modifications on and departures from that embodiment and presently preferred practice properly falling within the spirit and scope of the appended claims.

I claim:

1. A method of weaving comprising the steps of shedding a plurality of warp yarns and pulling a weft yarn through the shed from a supply of weft yarn maintained outside the shed, wherein the improvement comprises pulling said weft yarn from a knitted fabric stored outside the shed and unraveled by said pulling.

2. A method according to claim 1 wherein said knitted fabric includes yarn including synthetic fiber.

3. A method according to claim 1 wherein said fabric is in tubular form.

4. A method according to claim 1 wherein a plurality of yarns are simultaneously unraveled from the fabric and pulled into the shed.

5. A loom comprising means to shed a plurality of warp yarns, means to pull a weft yarn through the shed, means outside the shed to support a supply of weft yarn in the form of a knitted fabric, and a weight adapted to be disposed within a tube-shaped knitted fabric weft yarn supply disposed on said support.