

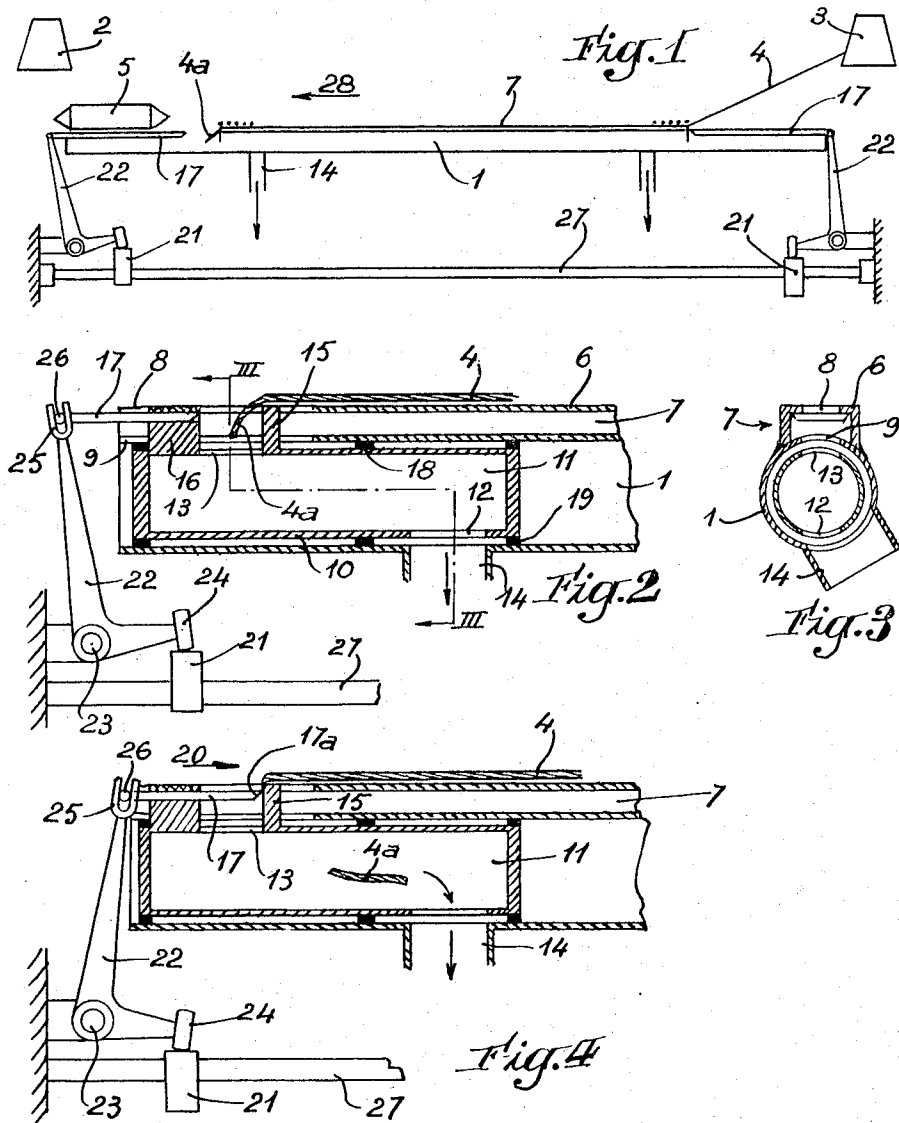
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M. CLAEYS

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WEFT THREAD RETAINING AND CUTTING DEVICE FOR SHUTTLELESS LOOMS

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INVENTOR

Marcel Claeys

BY

Alexander D. O'Neil

ATTORNEYS

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WEFT THREAD RETAINING AND CUTTING DEVICE FOR SHUTTLELESS LOOMS

Marcel Claeys, Lyon, France, assignor to Office Prive
des Inventions Modernes O.F.P.R.I.M., Villeurbanne,
Rhône, France, a French limited-liability company

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This invention relates to a weft thread retaining and cutting device for shuttleless looms of the kind in which the woven material has single or double, cut shoots obtained by passing the weft through the warp threads, not by a shuttle with a weft cop, but by means of a dummy shuttle or other devices of known type.

Said dummy shuttle or the like generally comprises a gripper member for gripping the weft during the movement through the shed, which gripper member is opened at the end of each pick of the dummy shuttle in order to release the weft thread. During the short space of time between this gripper opening and the shed closing, the weft thread has a tendency to curl as soon as released, particularly in the case of highly resilient threads. This results in an irregular disposition of the weft ends with respect to the selvage which produces fraying and gives the fabric a bad appearance.

To suppress these drawbacks, it has been proposed to suppress the weft thread tensioning, but this results in another disadvantage. The weft thread goes on through the shed by inertia after opening of the dummy shuttle gripper member and its free end projects out of the fabric selvage. Said protruding end is pulled back into the shed during the next pick of the dummy shuttle, which results in a very bad appearance of the fabric selvage.

In order to eliminate this new drawback, it has been proposed to place near the lay a suction nozzle adapted to turn aside the protruding weft end, out of the dummy shuttle path, or to retain it before cutting.

This known method cannot be used on shuttleless looms having weft supplies on both sides, since the suction nozzle would also turn aside, together with the protruding end of the preceding shoot, the next weft thread ready to be woven. Therefore, the dummy shuttle would pass without catching the said next weft.

An object of this invention is to suppress these drawbacks by realizing a weft retaining and cutting device adapted to be used on shuttleless looms having weft supplies indifferently on one side only or on both sides.

These objects are accomplished in a preferred embodiment of the invention by securing symmetrically on each end of the lay a unit comprising: a cylindrical sleeve gas-tightly and slidably mounted within the lay main tube; a thrust member rigidly secured to the upper portion of said cylindrical sleeve; a sliding plate moved in a reciprocating movement along the said main tube upper side and having a cutting front-edge coming into contact with the said thrust member at each stroke of the said reciprocating movement; an opening provided in the side walls of said cylindrical sleeve and lay main tube, between said thrust member and said sliding plate cutting edge; said opening being obturated by the said sliding plate when the cutting edge of the latter is in contact with said thrust member; and suction means connected to the inner space of said cylindrical sleeve.

The sliding plate is opened when the dummy shuttle comes out of the shed so that the weft free end is aspirated into the cylindrical sleeve, which retains the weft thread and prevents it from curling as long as the shed has not been closed again. After this operation, that is when the

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weft thread is at its definitive position between the warp threads, the sliding plate is shut, thus obturating the suction opening while cutting the weft protruding free end against the said thrust member. This prevents the next weft thread from being aspirated and turned aside at the next pick of the dummy shuttle.

In the drawings:

FIG. 1 is a diagrammatical view of a device according to the invention on a shuttleless loom having weft supplies on both sides, only one weft thread having been illustrated for the clarity of the drawings.

FIG. 2 is a fragmentary cross-section at an enlarged scale, showing a detail of the device object of the invention mounted at one end of the lay, the sliding plate being opened.

FIG. 3 is a section taken on the line III—III (FIG. 2).

FIG. 4 corresponds to FIG. 2 when the sliding plate is in closed position.

The retaining and cutting device shown in FIGS. 1 to 4 is mounted on the lay upper tube 1 of a shuttleless loom of known type having weft supplies 2 and 3 on both sides. For the clarity of the drawings, only one weft thread 4 has been illustrated, delivered by the right weft supply 3. Each weft thread is inserted through the shed by means of a dummy shuttle 5 of known type moved alternately to the right or to the left above the lay upper tube 1. The dummy shuttle 5 slides on the bottom 6 of a slideway 7 having a U-shaped cross-section. The side walls of said U-shaped slideway 7 are downwardly turned and welded along the lay upper tube 1.

At each end, the guide bottom 6 and the upper wall of tube 1 are slit in longitudinal openings 8 and 9 which may extend up to the end edge of tube 1.

Within tube 1 is slidably mounted a cylindrical sleeve 10 gas-tightly closed at both ends in order to define a suction inner space 11. The side wall of said cylindrical sleeve 10 has an opening 12 located near its inner end and orientated downwardly. Near the opposite end of said cylindrical sleeve 10, the side wall of the latter is provided with an opening 13 orientated upwardly. Openings 12 and 13 are diametrically opposed and located at both ends of the cylindrical sleeve 10. Opening 12 is placed in front of the inlet end of a suction tube 14 connected to the corresponding portion of tube 1.

On the upper portion of cylindrical sleeve 10 are welded a thrust member 15 and a guide 16 on which is slidably mounted a sliding plate 17 having a sharp front-edge 17a. Thrust member 15 and guide 16 are located on both sides of the opening 13 and they protrude upwardly through the longitudinal openings 8 and 9; their upper face is in the same plane as the upper face of bottom 6. The sliding plate 17 is adapted to obturate gas-tightly the opening 13 when its cutting edge 17a is in contact with the thrust member 15.

According to an important characteristic of the invention, cylindrical sleeve 10 may be slid axially within the lay tube 1 in order to adjust the loom according to the desired width of the fabric. During this movement of the cylindrical sleeve 10, the opening 12 is displaced with respect to the suction tube 14, but vacuum is retained within said cylindrical sleeve 10 by means of annular sliding seals 18 and 19 provided on both sides of tube 14 and opening 12 between the lay main tube 1 and the said cylindrical sleeve 10. Such an adjustment results in a displacement of the thrust member 15 with respect to the lay structure 1, 7, said thrust member 15 being slid along the openings 8 and 9.

The sliding plate 17 is horizontal and located near the bottom 6 of the U-shaped slideway 7. When its cutting edge 17a rests against the thrust member 15,

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the space above said sliding plate 17 is no longer subject to the suction resulting from the vacuum within the suction chamber 11.

Sliding plate 17 is displaced in a reciprocating movement in the direction indicated by arrow 20, by means of a rotary cam 21 which actuates a bell-crank 22 articulated on a spindle 23 rigidly secured to the lay. The lower arm of bell-crank 22 is provided with a roller or push-member 24 permanently urged against the rotary cam 21. The upper arm of said bell-crank 22 ends in a fork 25 engaged on a transverse stub 26 provided on the rear end of sliding plate 17.

According to another important characteristic of the invention, the cam 21 has a profile adapted to open the sliding plate 17 above the opening 13 when the dummy shuttle 5 comes out of the shed. On the contrary, sliding plate 17 is closed against the thrust member 15, thus obturating opening 13, after the shed has been closed, but prior to the lay beating.

The cams 21 are shifted angularly at 180° with respect to each other on the shaft 27 (FIG. 1) in order to actuate alternately the sliding plates 17 provided on each side of the lay tube 1, according as the dummy shuttle 5 is on the right side or on the left side of the loom.

The angular speed of said cam-shaft 27 is one revolution for two beating-up strokes of the lay.

The operation is as follows:

When the dummy shuttle 5 gets out of the shed as indicated by the arrow 28 (FIG. 1), it moves towards the corresponding shuttle-box after having released the recently woven weft thread 4. The corresponding suction opening 13 being opened (FIG. 2 and left portion of FIG. 1), the weft end 4a protruding on the side of the fabric is aspirated through said opening 13. The shed is then closed, which definitively retains the weft thread 4 and prevents the latter from any inopportune curling or resilient construction. After the shed has been closed, but prior to a new pick of the dummy shuttle, the cam 21 urges the sliding plate 17 as indicated by arrow 20 (FIG. 4). This operation has two results: firstly, the weft end 4a is cut off between the sharp edge 17a and the thrust member 15 and secondly, the suction opening 13 is obturated, thus preventing any swerving of the next weft thread, not shown in the drawings.

After cutting off the weft end 4a (FIG. 4), the latter is removed out of the loom, thus preventing any flock accumulation near the fabric. It will be appreciated that the weft thread 4 is already positioned within the shed after closing of the latter when the weft end 4a is cut off. This permits to obtain a very good selvage wherein all the weft threads have exactly the same length.

When the dummy shuttle 5 passes again above the suction opening 13 in the direction of arrow 20, said opening 13 is obturated and the next weft thread provided by left weft supply 2 may be caught without difficulty before being inserted into the shed.

Minor changes may be made without departing from the scope of the invention as claimed. More particularly, it is possible to actuate the obturating sliding plate by any known system; cams 21 and bell-cranks 22 could be replaced by electrical, electronical, pneumatic or hydraulic units.

I claim:

1. In a shuttleless weaving loom having a dummy

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shuttle and a lay provided with a horizontal main tube, a weft retaining and cutting device at each end of the said lay main tube, comprising the combination of a cylindrical sleeve gas-tightly and slidably mounted within said lay main tube; a thrust member rigidly secured to the upper portion of said cylindrical sleeve; a sliding plate movable in a reciprocating movement along the upper side of said lay main tube and having a cutting front edge adapted to strike the said thrust member during each stroke of the said reciprocating movement; the side walls of said cylindrical sleeve and lay main tube between said thrust member and said sliding plate cutting edge having registering openings therein adapted to suctionally retain the end of the weft thread therein, said openings being closed by the said sliding plate when the said cutting edge of the latter strikes said thrust member to sever the end of the weft thread; and suction means connected to the interior of said cylindrical sleeve while permitting the sleeve to be moved axially of the main tube to adjust for varying widths of fabrics.

2. A weft retaining and cutting device as claimed in claim 1, wherein said sliding plate is slidably mounted within a guide rigidly secured to the upper portion of said cylindrical sleeve, said guide and said thrust member protruding upwardly through said registering openings provided on the upper wall of said lay main tube and on the bottom of a slideway fixed to said lay main tube in order to guide the dummy shuttle.

3. A weft retaining and cutting device as claimed in claim 1, wherein said sliding plate is slidably mounted within a guide rigidly secured to the upper portion of said cylindrical sleeve, said guide and said thrust member protruding upwardly through said registering openings provided on the upper wall of said lay main tube and on the bottom of a U-shaped slideway opened downwardly and welded by the ends of its side walls to said lay main tube in order to guide the dummy shuttle.

4. A weft retaining and cutting device as claimed in claim 1, wherein said sliding plate reciprocating movement is obtained by means of a cam-shaft having a rotary speed equal to one revolution for two beating-up strokes of the lay, said cam-shaft being provided with two cams shifted angularly at 180° with respect to each other as each cam actuates one of the said combinations mounted on each end of the said lay main tube.

5. A weft retaining and cutting device as claimed in claim 1, wherein said suction means comprise a suction tube rigidly connected to the lower wall of said lay main tube and located in front of a side opening of said cylindrical sleeve, annular sliding seals being provided between said lay main tube and said cylindrical sleeve.

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MERVIN STEIN, *Primary Examiner*.

J. KEE CHI, *Assistant Examiner*.