June 3, 1969 M. CLAEYS 3,447,574

WEFT-GRIPPER FOR SHUTTLELESS LOOM

Filed June 22, 1966 Sheet 1 of 2

FIG 3.

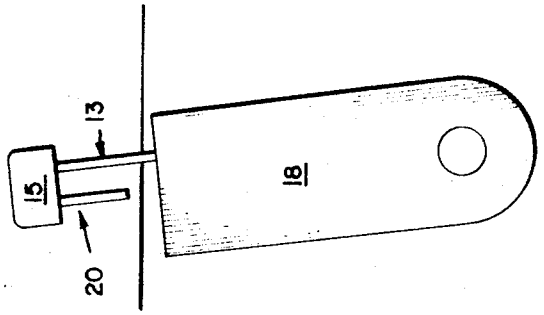


FIG 2.

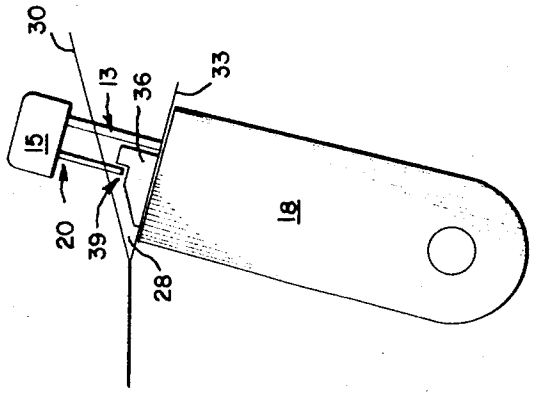


FIG 4.

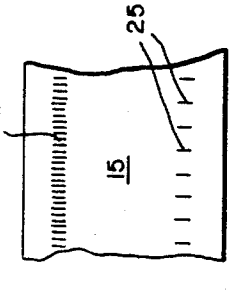
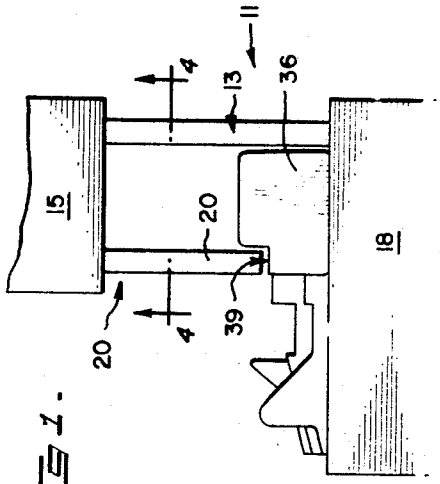


FIG 1.



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Sheet 2 of 2

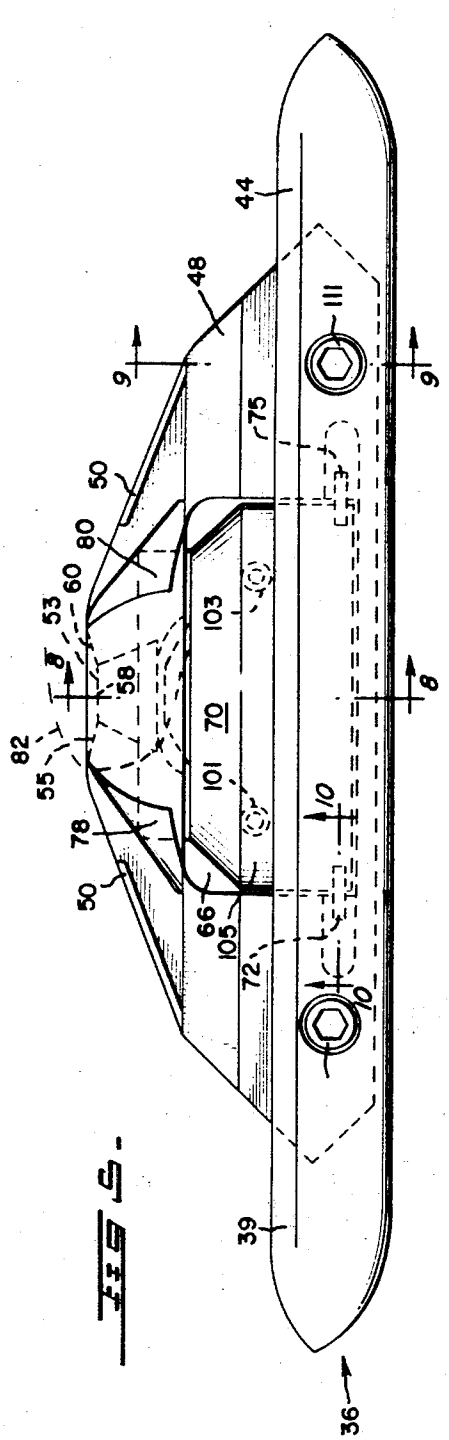

Fig. 5.

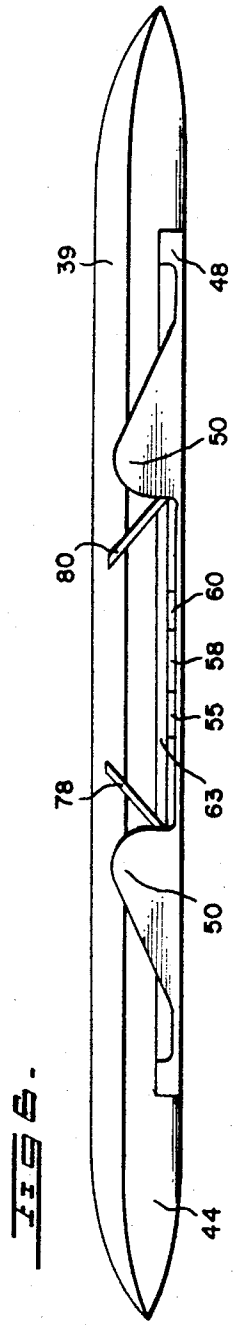

Fig. 6.

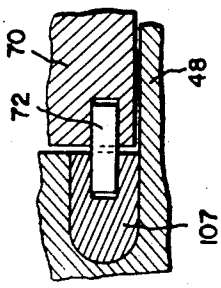

Fig. 10.

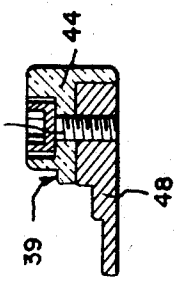

Fig. 9.

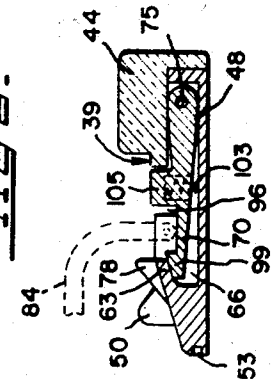

Fig. 8.

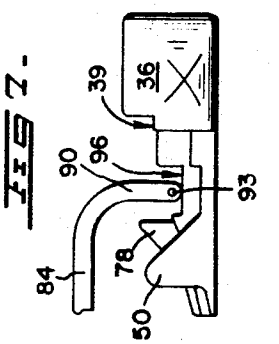

Fig. 7.

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WEFT-GRIPPER FOR SHUTTLELESS LOOM

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Filed June 22, 1966, Ser. No. 559,594
Claims priority, application France, Apr. 22, 1966, 46,159
Int. Cl. D03d 47/34, 49/62
Int. Cl. 139—125
7 Claims

ABSTRACT OF THE DISCLOSURE

The top surface of the weft-gripper contains a vertically movable jaw to grasp the yarn and a deep depression for the yarn supply. A shoulder on the weft-gripper cooperates with a false reed on the batten for guidance of the weft-gripper in flight.

This invention is concerned with an improved weft-gripper for a shuttleless loom and with certain loom modifications which tie in with the use of this improved gripper.

In traditional weaving, the weft or filling yarn is supplied by a movable containing a relatively large supply of yarn. This member has been named a shuttle due to its back-and-forth motion from one side to the other side of the loom. The shuttle passes through the shed of the loom which is composed of warp threads, some of which are upwardly placed to form the top of the shed and some of which are downwardly placed to form the bottom of the shed. In its passage through the shed, the shuttle unwinds a fill of yarn or thread and is caught at the other side of the loom. The reed is used to beat the fill of thread, deposited in the shed, against previous fills which by this time comprise the manufactured cloth. During the time of beating the shed usually is collapsed and remade, some or all of the warp threads previously forming the top of the shed, now forming the bottom of the new shed, while some or all previously bottom threads are in the top of the new shed. The shuttle is then propelled through the new shed, depositing another fill of yarn in this new shed and being caught at the other side of the loom.

The shuttleless or "false shuttle" loom is a relatively recent improvement in weaving machines. In such looms the supply of weft yarn is mounted as a stationary supply at one or both sides of the loom. A movable member grasps an end of thread from such supply and is propelled partially or fully through the shed. This movable member or weft-gripper is designed to grasp an end of the stationarily mounted yarn, the rest of the length of yarn, comprising a fill and perhaps a little more yarn, trailing behind the weft-gripper.

In one type of such loom, a plurality of grippers is employed to carry a length of filling yarn through the shed. Each of the plurality of grippers, in succession, grasps an end of filling yarn from the stationary supply at one side of the loom, is propelled through the shed and releases the end at the other side, being caught by a brake box and returned to the loading position by a conveyor system. In another type of apparatus a gripper mechanism reciprocates, shuttlewise, through the shed, grasping ends of filling yarn from a stationary supply at either side of the loom, being propelled through the shed and releasing the end of filling yarn at the other side of the loom. The trailing portion of the filling yarn, of course, is left in the shed, where it is beaten, etc., as a fill in the traditional loom.

The shuttleless loom provides a number of advantages in weaving. It will be readily appreciated that a weft-gripper need be only a small fraction of the weight of a traditional shuttle, which must contain a large supply of

filling thread, thus passage of the weft-gripper through the shed is generally faster making for greater productivity of the cloth per loom. Also, the weight of the weft-gripper remains constant during its use, rather than declining in weight as a yarn supply nears exhaustion. Thus, the speed of passage through the shed can remain constant during fabrication of a length of cloth and the time allowed for beating, shed formation, etc., may be more accurately gauged without allowance for variation in the speed of fill deposition in the shed. It is apparent, also, that the use of a shuttless loom obviates the need for shuttle winding, the stationary weft holders being able to hold as much yarn as desirable, for example, being as large as warp-yarn holders.

It is apparent that more operations need to be performed in the use of a shuttleless loom than are generally required in traditional weaving. For example, it is necessary for the weft-gripper to have means for firmly grasping an end of thread and for releasing this end at the proper time, which may be after passage through the shed or during passage through the shed when the loose end is to be tucked into the new shed as selvedge. Also means for cutting thread and for obtaining a new end of thread from a thread feeder should advantageously be provided. In addition, the faster passage through the shed of a weft-gripper, when compared to a shuttle, indicates a need for more positive definition of the raceway than is required in a shuttle loom.

To perform these operations weft-grippers have been made with shears or a blade and one or two clamps which open when they pass over pre-set bosses along the raceway of the weft-gripper. The customary weft-holders, usually made entirely of metal, present the inconvenience of being difficult to guide over the length of their tracks without suffering unusually heavy wear, and at the same time, the clamps and blades with which they are equipped preclude use at high speeds and with fine threads.

To avoid these inconveniences, the weft-gripper of this invention provides a movable jaw for firmly gripping the weft-yarn end and for releasing it at the proper time in response to a fixed or movable actuating mechanism. It also provides means for cutting the thread. In addition, this invention supplies an improved guide means to define the weft-gripper raceway.

The weft-gripper has a flat bottom and provides a recess on its top surface to contain the movable jaw. The motion of this jaw is advantageously a pivoting motion and the jaw may be spring-biased to a "closed" position against a fixed upper lip of the gripper. The jaw pivots on an axis parallel to the line of travel of the weft-gripper. The jaw is opened for release of the weft-yarn by a control mechanism which may impinge, at the proper moment of the flight of the gripper, after leaving the shed against a boss attached to the jaw. The fixed portion of the weft-gripper has a generally trapezoidal shape and its extreme angles are curved slightly upward in order to facilitate the introduction of the thread between the fixed portion and the movable jaw when the weft-gripper has just been thrown. In addition, lateral protective stops rise above the flat bottom on each side of the fixed portion. These stops are rounded to allow them to lift in succession the warp threads composing the upper shed at the pace at which the weft-carrier travels. This operation is intended to keep the warp threads from being caught by the upturned extreme angles.

The cutting mechanism is mounted on the front of the fixed portion of the weft-gripper and advantageously is a double blade. Thus, the weft-gripper provides a cutting member with a plurality of cutting surfaces. A longitudinal groove or depression is made in the upper surface of the movable jaw for insertion of a feeder of weft yarn.

This depression reaches a plane lower than the jaw opening to insure its being seized, even if it should be caught. As mentioned, means are provided to guide the yarn supply into the open jaws and upon closing of the jaws and subsequent travel of the gripper, the cutting surfaces act to cut the weft-yarn from the supply, often enabling this loose end to be carried partially into the shed where it may be tucked into the warp threads to form a selvedge. Advantageously, the weft-gripper is essentially symmetrical, so that it may function in the same manner on either side of the loom.

Certain modifications of the loom have been found advantageous in relation to operating the loom with the improved weft-gripper. For one thing, it has been found advantageous to provide a false reed forward of the reed of the loom. This false reed has fewer tines than the reed, but these tines are aligned with tines of the reed. This false reed does not extend downwardly all the way to the batten but rather leaves a gap which defines a raceway for the weft-gripper across the loom. The weft-gripper is fashioned so as to provide a shoulder for reception of the false reed on its upper surface and advantageously the parts of the gripper which are subject to passage in contact with the extremely abrasive reed and false reed, are made of a self-lubricating fiber-reinforced synthetic resin. The batten and movable jaw are preferably made of metal.

This invention will be better understood by reference to the accompanying drawings in which

FIGURE 1 shows the novel weft-gripper of this invention in its passage through the shed of the loom;

FIGURE 2 shows the batten with the weft-gripper in the shed-passing position;

FIGURE 3 shows the batten in the filling beating position after passage of the weft-gripper;

FIGURE 4 is a cross-sectional view of the reed and the false reed, taken along the line 4—4 of FIGURE 1;

FIGURE 5 is a top view of the novel weft-gripper of this invention;

FIGURE 6 is a front view of the weft-gripper;

FIGURE 7 is a side view of the gripper as in FIGURE 1 with a thread feeder in position to feed thread;

FIGURE 8 is a cross-sectional view along the line 8—8 of FIGURE 5;

FIGURE 9 is a cross-sectional view along the line 9—9 of FIGURE 5; and

FIGURE 10 is a partial cross-sectional view along the line 10—10 of FIGURE 5.

As can be seen from the drawings, the loom, indicated generally as **11** has a reed **13** placed between the transverse bar **15** and the batten **18**. Supported by the transverse bar **15** is the false reed **20**. As can be seen from FIGURES 1–3, the false reed **20** is shorter than the reed itself. Also, FIGURE 4 makes it clear that the reed **13** comprises a plurality of tines **22** spaced relatively close together, as is conventional, while the false reed **20** comprises the tines **25** spaced wider apart, for example, about one tine **25** for each five tines **22**. Each tine **25** is (however, aligned with a tine **22** to allow formation of the shed **28**, comprising upper warp threads **30** and lower warp threads **33**. It will be noted that the tines **25** are held only at their upper end.

As can be seen clearly from FIGURE 2, the weft-gripper passes through the shed **28** guided by the reed **13** and the upper surface of the batten **18** and also by the false reed **20** which advantageously fits into a shoulder **39** of the weft-gripper. After passage through the shed and collapse of the shed preparatory to making a new shed, the batten oscillates to the position of FIGURE 3 in order for the reed **13** to beat the filling yarn deposited in the shed by passage of the weft-gripper **36**. Oscillation of the batten **18** may be brought about by any suitable means, for example, by the means described in my copending application Ser. No. 559,621, filed of even date herewith, and

timed to coincide with the absence of the weft-gripper from the shed.

The weft-gripper **36** comprises a body **44** to the underside of which the metal plate **48** is attached. This metal plate **48** projects forwardly of the body **44** and advantageously is tapered and provided with the ears **50** to prevent the weft-gripper from becoming entangled in the warp threads **30** during passage through the shed **28**. The metal plate **48** is also provided at its forward edge with the recess **53** into which a blade having cutting edges **55**, **58** and **60** may be placed. Metal plate **48** is curved-around forwardly to present the lip **63**, and has the central cut-out position **66** wherein the jaw **70**, pivoted at **72** and **75**, operates. The inner edges **78** and **80** of the lip **63** at the recess **66** are curved upwardly to facilitate introduction of the filling thread **82** when the thread holder **84** puts its downturned portion **90**, containing the eye **93** into the depression **96** of the movable jaw **70**. It is clear that this eye **93** may have weft-yarn threaded through it. It will be noted from FIGURE 2 that the ears **50** are closer to the upper warp threads **30** then the upward-curved edges **78** and **80** during passage of the weft-holder through the shed, thus keeping the warp-threads out of the way of edges **78** and **80**.

The forward edge **99** (see FIGURE 8) of the movable jaw **70** is biased upwardly around the pivots **72** and **75** by any convenient means such as springs **101** and **103** and has on its upper surface a boss such as **105**, which, as shown, may be longitudinally extending for depressing of the jaw **70** to release and/or grasp the thread **82** at the proper times in the flight of the weft-holder, the boss being adapted to contact control elements on the loom which may be fixed or movable, as explained, for example, in my copending application Ser. No. 559,595, filed of even date herewith.

The articulation of the jaw **70** of the clamp in relation to the fixed portion of the weft-gripper is insured by means of stationary bearings **107** which are fixed in the sockets provided to this effect on the upper part of plate **48**. Each of these bearings **107** is made on a square transversal section and carries an axial socket in which one of the ends of the corresponding pivots **72**, **75** is lodged. The other extremity of this pivot is fixed in a blind socket made opposite to the axial socket in the mobile jaw **70**. The unit is assembled by engaging the bearings **107** in the plate **48** and then capping this mechanism (shown in FIGURE 10) with body **36** which is held firmly in place by two bolts **109** and **111** whose tightly screwed nuts are embedded in body **44**.

As previously explained, and as shown in FIGURE 2, the back of the body **44** and also the shoulder **39** pass through the shed **28** guided by the tines **22** of reed **13** and the tines **25** of false reed **20**. Such action is severely abrasive to the weft-gripper and has led to short life for many such devices used in the past. To overcome these disadvantages, the body **44** is preferably made of a very durable and smooth synthetic material which practically cuts out wear and, moreover, eliminates any risk of vibration of the teeth **25** of the false reed **20** during the passage of the weft-holder. This synthetic material ideally is composed of textile fibers impregnated with a synthetic resin. The resultant unit possesses self-lubricating qualities. This body **44** permits the weft-holder to run along its track easily and insures minimum wear to the control elements.

It can be seen from the above description that the weft-holder of this invention, by interaction between the eye **93**, the jaw **70** the edges **78** and **80** and the ears **50**, allows the weft-gripper to seize the thread as it comes out of the stationary supply and cut it by means of one of the cutting edges **55**, **58** or **60**, soon after its entry into the shed in order to bury the loose end. The remaining attached thread is drawn across the shed. At the other side of the shed, the movable jaw **70**, operated through the boss **105**, against the bias of the springs **101** and **103** releases the

thread when it emerges from the shed before entering into the opposite brake box.

It should be understood, of course, that the preceding description is only given as an illustration and should not be construed as limiting the scope of the invention which lends itself to such a wealth of variations that it would be impossible to describe them all.

In particular, the invention is not affected by replacing the pivots **72** and **75** and/or their bearings **107** by another articulation system for the jaw **70** of the clamp.

What is claimed is:

1. A weft-gripper for false-shuttle looms comprising a body having a flat bottom, a depression along the length of its upper surface for reception of a supply of weft-yarn, a vertically movable jaw in a recess in said upper surface, a spring holding said jaw against a fixed upper lip situated to the side of and above the lowest plane of said depression, means for guiding said weft-yarn into said jaw and said depression and means for cutting a length of weft-yarn from said supply.

2. A weft-gripper according to claim **1** in which the weft-gripper is essentially symmetrical to provide for jaw and cutter operation at either end of the loom.

3. A weft-gripper according to claim **1** in which said jaw is provided with upwardly projecting opening means.

4. A weft-gripper according to claim **1** in which said jaw is pivoted.

5. In a shuttleless loom provided with a batten bearing a reed, the improvement which comprises a false reed having fewer tines than said reed, the tines of said false reed being aligned with tines of the reed, said false reed being suspended above the batten by a space sufficient to define a raceway, in combination with a weft-gripper, having a shoulder into which said false reed fits, to guide the weft-gripper in flight, both vertically and horizontally.

6. The combination of claim **5** in which the false reed has about one tine for every five tines of the reed.

7. The combination of claim **5** in which the parts of the weft-gripper which contact said reed and false reed are made of a self-lubricating synthetic resin.

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JAMES KEE CHI, *Primary Examiner.*

U.S. Cl. X.R.

139—188, 192

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,447,574 Dated June 3, 1969

Inventor(s) Marcel Claeys

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

In the heading, change "April 22, 1966" to --June 25, 1965--;

Column 1, line 24, between "movable" and "containing", insert --member--;

Column 3, line 58, change the Parentheses [(] to a comma [,].

SIGNED AND
SEALED
JAN 6 - 1970

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents