June 17, 1969 R. B. GOLOBART 3,450,169

SELVEDGE FORMING DEVICE IN SHUTTLELESS LOOMS

Filed April 21, 1967 Sheet 1 of 5

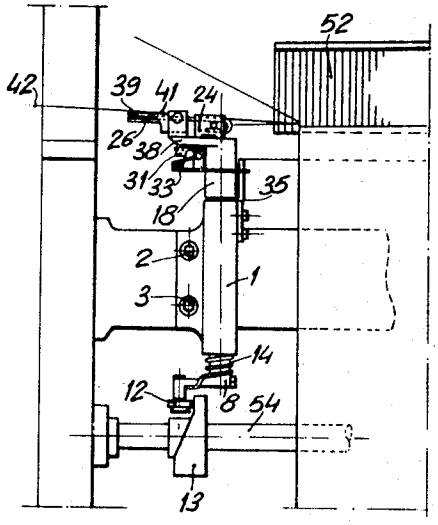


Fig 1

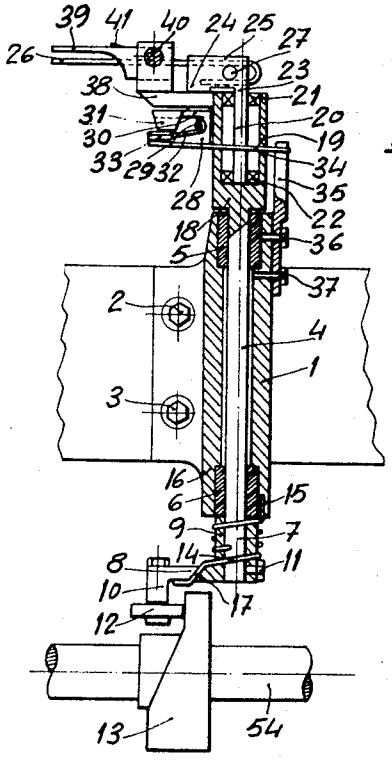


Fig 2

June 17, 1969 R. B. GOLOBART 3,450,169

SELVEDGE FORMING DEVICE IN SHUTTLELESS LOOMS

Filed April 21, 1967 Sheet 2 of 5

Fig 3

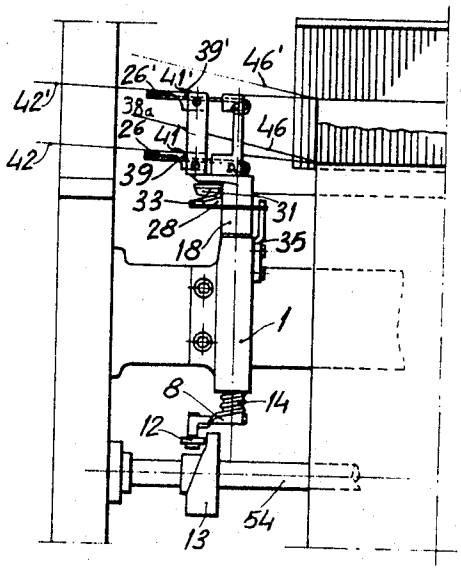
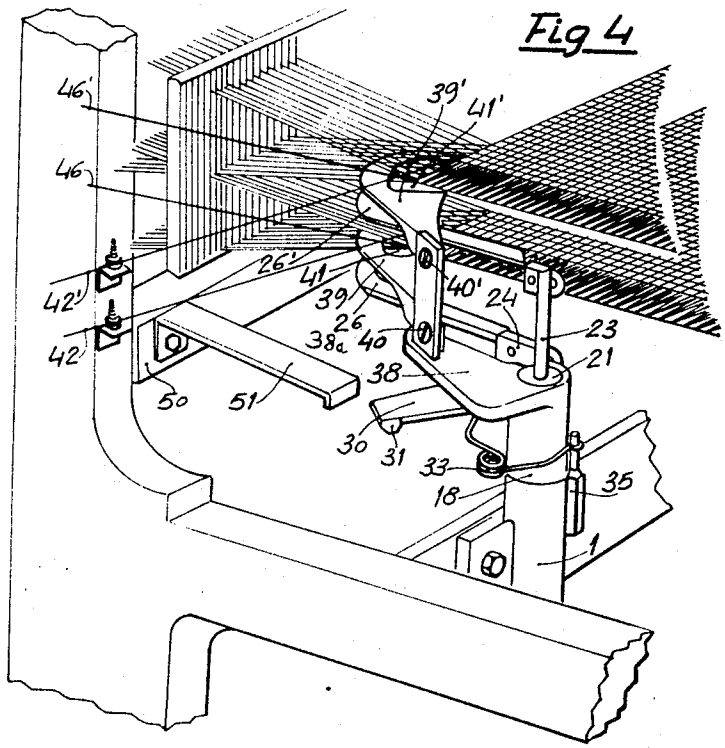


Fig 4



June 17, 1969 R. B. GOLOBART 3,450,169

SELVEDGE FORMING DEVICE IN SHUTTLELESS LOOMS

Filed April 21, 1967 Sheet 3 of 5

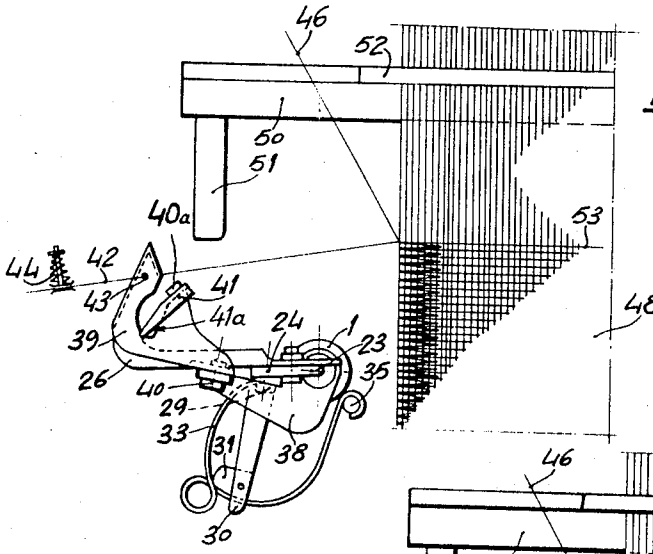


Fig 5

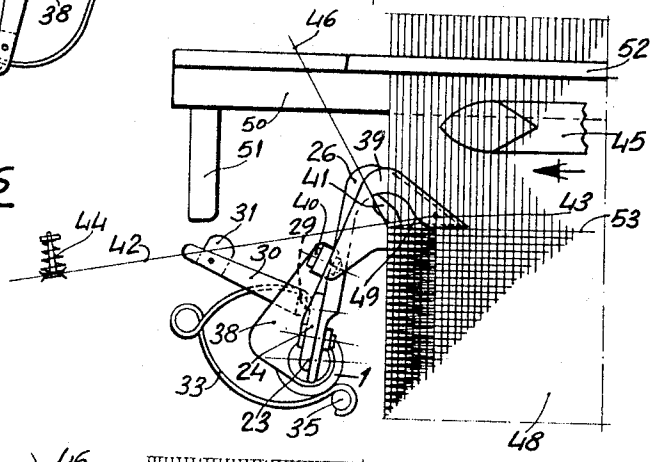


Fig 6

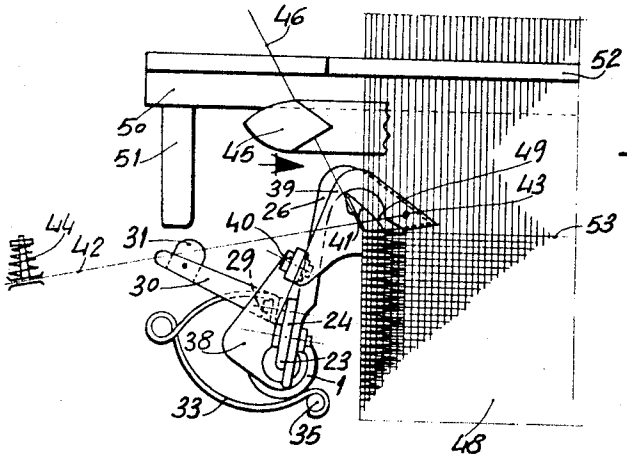


Fig 7

Fig 8

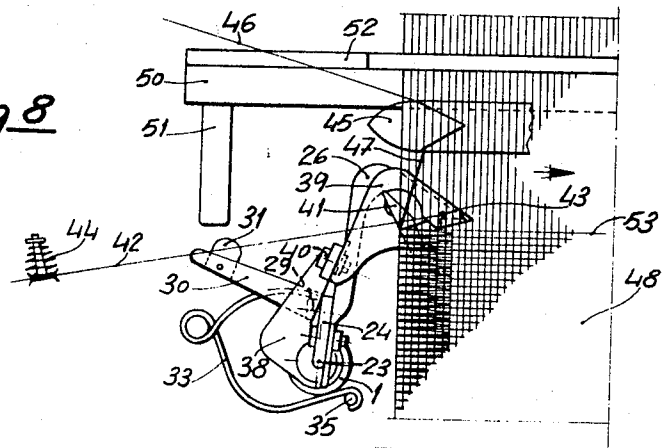


Fig 9

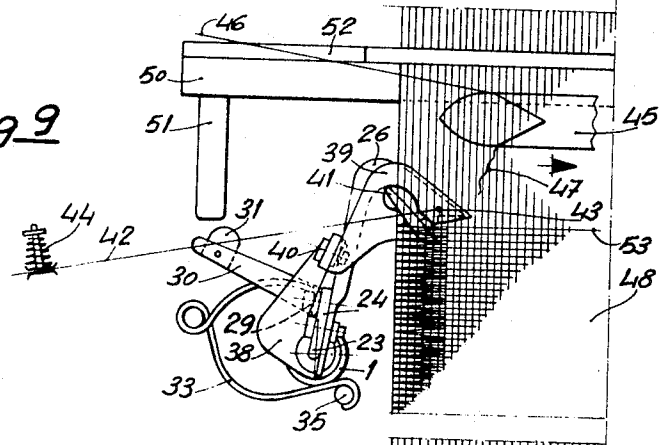


Fig 10

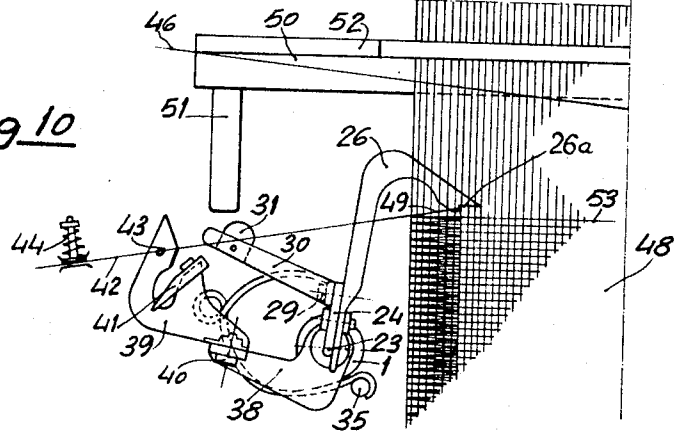
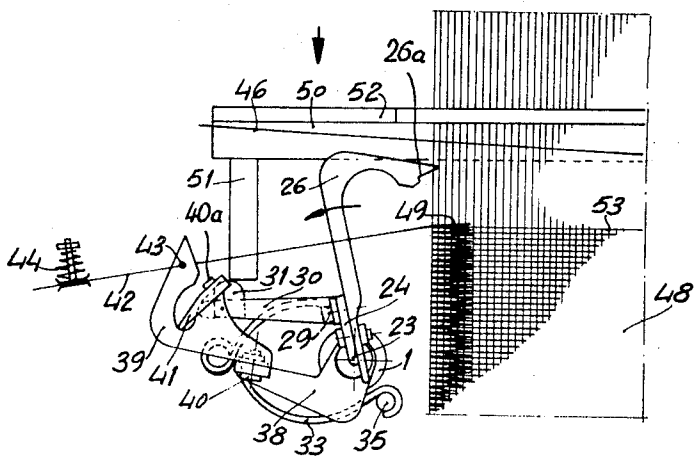


Fig 11


26a
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52
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26
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49
53
44
43
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48
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40
38
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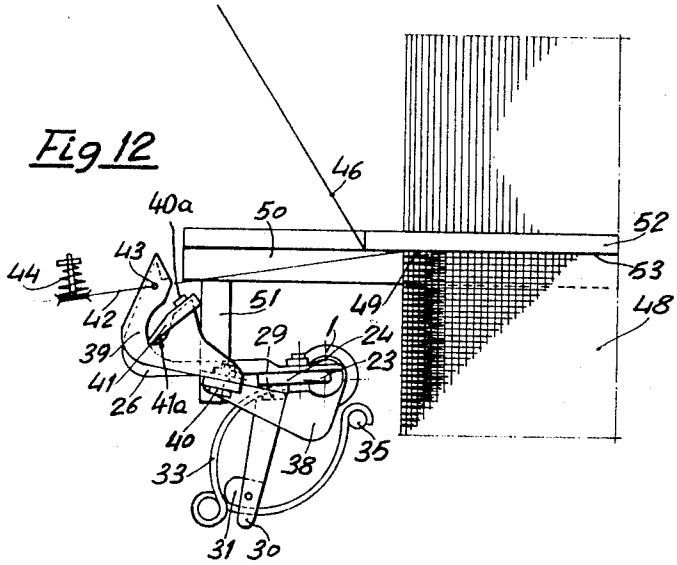
Fig 12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3,450,169

SELVEDGE FORMING DEVICE IN SHUTTLELESS LOOMS

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Claims priority, application Spain, May 5, 1966, 326,732
Int. Cl. D03d 47/46
U.S. Cl. 139—122 7 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for forming selvedges at the edge of a fabric woven on shuttleless looms which operates to insert into said edge an independent thread and includes an inserting arm for said thread and a retaining arm for retaining positioned said thread. The apparatus may be adapted to form two selvedges simultaneously on looms weaving superimposed fabrics.

The present invention relates to a selvedge forming device in shuttleless looms, especially for looms producing two parallel fabrics at a time which comprises two sets of warp threads for forming two superimposed sheds, weft thread inserting elements, a loom slay for beating up the weft threads, and supplemental independent threads for the formation of the selvedges of the fabrics.

The different systems of known selvedge forming devices are based on a hook carrying a supplemental independent thread and introducing the same in a loop-like form between the outer warp threads of the shed, where it is retained by a pin actuating in opposition to the hook. There exist also selvedge forming devices producing so-called false selvedges, in which the selvedges are formed without supplemental independent threads by the alternative crossing in different senses of the outer warp threads and their interlacing with the weft thread, as well as selvedge forming devices based on grippers, hooks, or brushes which introduce the protruding ends of the weft threads into the shed, either mechanically or by an air current.

Experience has demonstrated that the selvedges formed by supplemental independent threads have better consistency. The present invention improves these systems of forming selvedges with supplemental independent threads. In the known systems of this type of selvedge forming devices, the supplemental independent thread is guided by a hook which has to move a considerable distance until the supplemental thread is reached by the pin which retains it during the return travel of said hook to its starting point and the advance movement of the loom slay for being clamped on the forming line of the fabric. These systems are technically impractical on looms for producing two parallel fabrics, due to the inability of adapting the operating mechanisms of the pins, as the size of these mechanisms is much bigger than the space available between the two fabrics and as any possible interference of the said pins and their operating mechanisms with the advance movement of the loom slay must be avoided in order to exclude any tendency of unequal tension of the supplemental independent thread when the looms work at a high speed.

It is an object of the present invention to overcome these disadvantages. This is achieved by the fact that the supplemental independent selvedge forming thread effects a very short travel for its introduction in the shed and does not depend on the clamping by a retaining pin, which, in addition to damaging in certain cases the warp threads during its travel through the shed, makes it impossible for

the looms to work at a high speed, especially in the case of looms for producing two parallel fabrics at a time.

It is a further object of the invention to provide a selvedge forming device in which the insertion of the supplemental independent thread is effected without the use of any retaining pin adapted to pass through the shed, thus eliminating completely the risk of damaging the warp threads and, therefore, enabling the loom to run at a high speed, particularly in the case of looms for producing two parallel fabrics at a time.

A further advantage of the selvedge forming device according to the present invention is that it allows for severing automatically the weft thread at the border of the fabric and to adjust the severing in such a way, that the protruding end may have any desired length.

It will be easily understood that as the said device resolves the selvedge formation in two parallel fabrics at a time, it may also be used for the selvedge formation in one single fabric, as will be explained hereinafter.

The device according to the invention is essentially characterized in that it comprises two angularly bent pivotally mounted superposed plates, the upper one, provided with a hole at one end for the passage of the supplemental independent thread and with a small adjustably fixed knife for cutting the weft thread, being connected through its other end to a sheetlike support member secured to a main shaft of the device. The lower angularly bent plate, provided with a notch at one end for retaining the supplemental independent thread at the selvedge, is secured at its other end to a secondary freely rotating shaft, coaxially arranged with respect to the said main shaft of the device, the whole being arranged near the outer warp thread of the loom and connected through a cam means to a rotary shaft of the loom in such a manner that the said upper angularly bent plate is actuated by a reciprocating swinging motion through the said main shaft of the device, pulling with itself, in one direction of the said reciprocating motion, the lower angularly bent plate to the selvedge of the fabric for introducing a loop of the supplemental independent thread into the shed between the outer warp threads against the action of a spring means and in synchronism with the insertion of the weft thread into the shed by the weft inserting element, the inserted weft thread being severed by the knife at the beginning of the return travel of the upper angularly bent plate, while the lower angularly bent plate retains in its notch the loop of the supplemental independent thread between the outer warp threads until the beating up of the respective weft thread.

The selvedge forming device according to the invention is further characterized in that the upper angularly bent plate is firmly secured to the main shaft of the device, so that its return movement to the starting position is caused by the return rotation of the shaft, while the lower angularly bent plate is maintained in its advanced position by means of the pressure of the spring means, so that its notch retains the loop of the supplemental independent thread in the selvedge, the return movement of said lower angularly bent plate being caused by an element provided on the loom slay and adapted to strike during its advance movement against a nose of the lower angularly bent plate, thus discharging the spring means. At the end of the advance movement of the loom slay the shed is closed in conventional manner, whereby the loop of the supplemental independent thread introduced between the outer warp threads of the selvedge is beaten up simultaneously with the weft thread of the preceeding passage. Thereafter, the angularly bent plates initiate a further cycle of movements for the formation of the selvedge of the next weft thread insertion.

For the better understanding of the invention there will

now be described by the way of nonlimitative examples and with reference to the accompanying drawings, specific embodiments of selvedge forming devices for a loom producing one single fabric, as well as for a loom producing two parallel fabrics at a time.

In these drawings,

FIG. 1 is a schematic front view of the device arranged near the selvedge at the feeding side of a loom for producing one single fabric.

FIG. 2 is a schematic front view with parts in section of the same device on an enlarged scale.

FIG. 3 is a schematic front view of the device arranged near the selvedge at the feeding side of a loom for producing two parallel fabrics at a time.

FIG. 4 is a schematic perspective view of the device corresponding to FIG. 3.

FIGS. 5, 6, 7, 8, 9, 10, 11 and 12 are schematic plan views showing the device in different positions.

The device itself, FIGS. 1 and 2, comprises a support member **1** fixed to a stationary frame part of the loom at the feeding side of the weft thread by means of the screws **2** and **3**. This support member **1** is provided with a bore through its entire length for the passage of a main shaft **4** rotatably guided by means of the bearings **5** and **6**. At the protruding lower end **7** of this main shaft **4**, there is provided a lever arm **8** having two bushes **9** and **10** at its ends, the protruding lower end **7** of the main shaft **4** being secured to the bush **9** of the lever arm **8** by means of a screw **11**. The bush **10** of the lever arm **8** carries a roller **12** sliding on a cam **13** fixed on a rotating shaft **54** of the loom. For maintaining the roller **12** in constant contact with the cam **13**, there is provided a helical spring **14** which surrounds the bush **9** of the lever arm **8**, the short leg **15** of said helical spring **14** being inserted into the base **16** of the support member **1**, and the long leg **17** engaged with and exerting a lateral pressure on the arm **8**.

The head **18** of the main shaft **4** is constituted by a tubular extension **19** of larger diameter and containing an independent secondary shaft **20** of smaller diameter than the main shaft **4**. This secondary shaft is rotatably guided in the bearings **21** and **22** carried by the tubular extension **19**. To the outer part **23** of this independent secondary shaft **20** of smaller diameter, there is secured an angular wing-like projecting part **24**, the upper portion **25** of which carries the angularly bent retaining arm **26** provided with a notch, fixed thereto by means of a screw **27**. To the lower portion **28** of the said wing-like projecting part **24** there is secured by means of a screw **29** an element **30** having a nose **31** at its free end. At the same lower portion **28** of the wing-like projecting part **24** there is also secured by means of the screw **29** the short leg **32** of a spring member **33**, the long leg **34** of which is rotatably connected to an extension **35** of the support member **1**, fixed thereto by means of screws **36** and **37**.

Thus, it will be apparent from an inspection of the drawings that spring **33** acts with an over-the-center snap action to urge the retaining arm towards one or the other of two extreme positions; the arm shown as fully withdrawn from the shed in FIGS. 5 and 12 and in its fully inserted position in FIGS. 6–10. In FIG. 11, the withdrawing movement, in a counterclockwise direction, has begun and the arm is about to reach the point at which the spring **33** will cause the arm to snap towards its fully withdrawn position as shown in FIG. 12.

From the tubular extension **19** of the head **18** of the main shaft **4** there is protruding an angular support member **38**, having an upwardly extending projection **38***a* (FIGS. 3 and 4) to which there is secured, by means of a screw **40**, the angularly bent inserting arm **39** in which hole **43** is provided and which carries a small knife **41**, retained by means of an adjusting screw **40***a* and having cutting edge **41***a*.

The operation of the device is as follows:

At the beginning of the rotation of the cam **13** there is caused an angular displacement of the lever arm **8** and, consequently, a corresponding rotation of the main shaft **4** and the support member **38** carrying the inserting arm **39** provided with a hole and acting on the retaining arm **26** provided with a notch **26***a* and carried by the secondary shaft **20** rotatively arranged in the interior of the tubular extension **19** of the head **18** of the main shaft **4**. This movement results from the fact that the projection **38***a* engages with the outer edge of arm **26** to carry arm **26** far enough in the clockwise direction to cause spring **33** to urge arm **26** into the shed as shown in FIG. 6. On further rotation of the cam **13**, the pressure of the helical spring **14** on the lever arm **8** causes the return movement of the main shaft **4** to its starting point and, therefore, of the angular support member **38** together with the inserting arm **39** provided with a hole, whereas the secondary shaft **20** remains in static position, as well as the retaining arm **26** provided with a notch, in order to retain the supplemental independent thread **42** between the outer warp threads of the shed, FIG. 10, as will be described below.

FIG. 5 shows in a schematic plan view the starting position corresponding to the position of the device is illustrated in FIG. 1. In this position the supplemental independent thread **42** passes through the hole **43** in the inserting arm **39** provided with the small knife **41**. The said supplemental independent thread **42**, proceeding from a bobbin (not shown), passes through a tension device **44**, and the inserting arm **39** and the retaining arm **26** are prepared to initiate the formation of the loop of the supplemental independent thread **42** by an arc-like advance movement towards the selvedge. As soon as the main shaft **4** is rotated together with the angular support member **38** which carries the inserting arm **39**, the said support member simultaneously pushes the retaining arm **26** and opens the spring member **33**, thus introducing the inserting arm **39** and the retaining arm **26** into the shed between the outer warp threads, as may be seen in FIG. 6, the cutting edge of the small knife **41** being situated just on the border of the fabric. In this FIG. 6 there is shown at **45** the weft inserting element advancing to meet the weft thread **46** and to grip it as shown in FIG. 7. From this moment, the weft inserting element **45** travels back drawing with it the weft thread **46** proceeding from the bobbin, not shown, FIG. 8, and causes the severing of the end **47** of the weft thread **46** proceeding from the last passage of the fabric already manufactured **48**, FIG. 9. The weft inserting element **45** continues its return travel towards the opposite side drawing with it the weft thread **46** through the shed. At this moment and by means of the rotation of the cam **13**, the inserting arm **39** carrying the small knife **41**, is returned to its starting position, FIG. 10, whereas the retaining arm **26** remains in static position due to the pressure exerted by the spring member **33** and retains, by means of the notch **26***a*, the loop **49** of the supplemental independent thread **42** in the shed between the outer warp threads. The loom slay **50** then begins its advance movement, FIG. 11, during which the projection **51** of the same meets the nose **31** of the wing-like projecting part **24** and causes the retaining arm **26** to initiate its return movement, but leaving the loop **49** of the supplemental independent thread **42** in the shed between the outer warp threads. Finally, the action of the projection **51** on the nose **31** causes the discharge of the spring member **33** and, therefore, the total return of the bent plate **26** to its starting position, and, at the same time, the inserted weft thread **46** and the loop **49** of the supplemental independent thread **42** are simultaneously beaten up on the forming line **53** of the fabric by the reed **52** of the loom slay **50**, FIG. 12.

The described operations are carried out with one selvedge forming device on a loom for producing one single fabric, as illustrated in FIG. 1. In the case of using said device on a loom for producing two parallel fabrics at a time, it will be sufficient to arrange on the main shaft

4, two inserting arms 39 and 39' having a hole and on the secondary shaft 20 two retaining arms 26 and 26' having a notch, as shown in FIGS. 3 and 4, in which all the duplicated elements are designated with the same reference numerals as in FIGS. 1 and 2, but provided with an apostrophe.

Other modifications and improvements in the invention may be made by those skilled in the art which would come within the scope of the annexed claims.

What I claim is:

1. Apparatus for forming a selvedge at the side of a fabric woven on a shuttleless loom by means of an independent thread, comprising an inserting arm provided with a hole for carrying the independent thread into the shed and a knife for severing a weft thread gripped by an inserting means of the loom, a retaining arm for holding the independent thread carried into the shed by the inserting arm, means for mounting both said arms on a loom for reciprocatory pivotal movement into and out of the shed, means for connection with a loom for moving both said arms into the shed together for inserting the independent thread and severing an inserted weft thread, for moving the inserting arm out of the shed alone while the retaining arm remains in the shed and for moving the retaining arm out of the shed before the slay completes beating up the inserted weft thread.

2. The invention as defined in claim 1 wherein said means for mounting both said arms includes a pair of coaxial vertically positioned shafts.

3. The invention as defined in claim 2 wherein said means for moving both said arms includes cam means for connection with the rotating element of a loom and a lever arm fixed on one of said shafts for operative engagement with the cam means.

4. The invention as defined in claim 1 wherein said retaining arm is mounted on vertically positioned shaft, and said means for moving both arms includes spring means connected between said shaft and a fixed support means for urging said retaining arm toward one of two positions, one of said positions being within the shed, the other position being withdrawn from the shed.

5. The invention as defined in claim 4 wherein said means for moving both said arms includes a projecting element on the inserting arm for initiating movement of the retaining arm towards the shed, and an element on the slay for initiating movement of the retaining arm out of the shed.

6. The invention as defined in claim 3 wherein said means for moving both arms also includes a projecting element on the inserting arm for initiating movement of the retaining arm into the shed.

7. The invention as defined in claim 6 wherein said means for moving both arms also includes an element on the slay for initiating movement of the retaining arm out of the shed.

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