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Aug. 15, 1944. A. MOESSINGER 2,355,741

THREAD INSERTIONS IN NIPPER LOOMS

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Fig. 1.

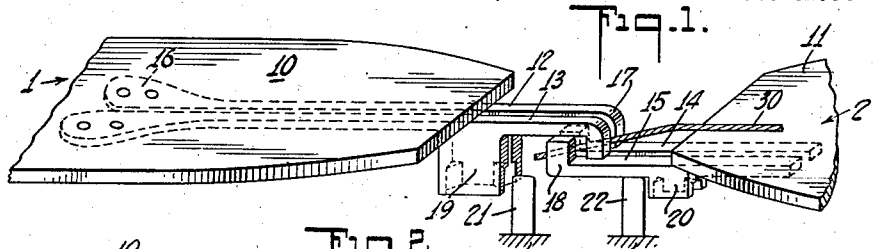


Fig. 2.

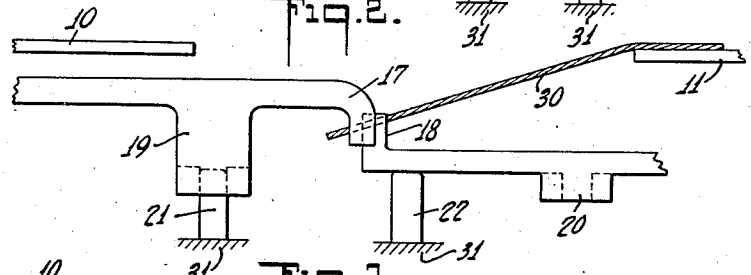


Fig. 3.

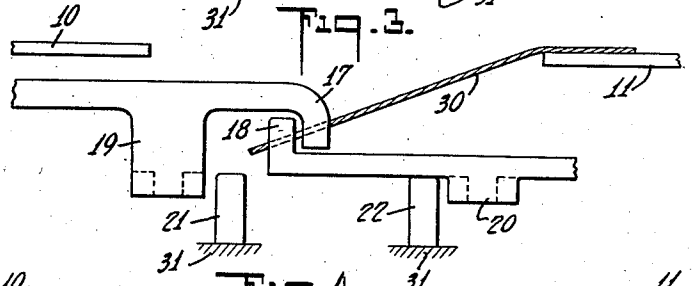


Fig. 4.

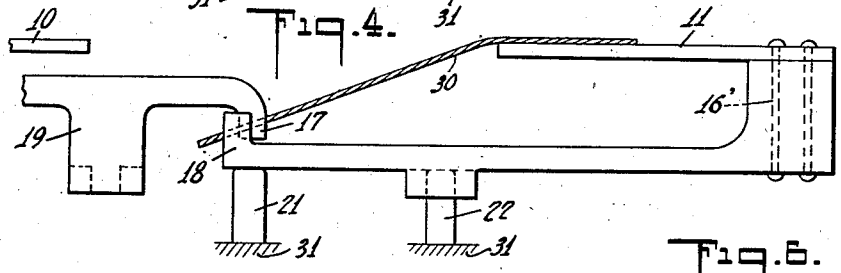


Fig. 5.

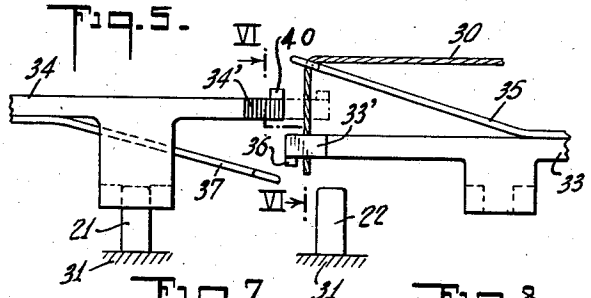


Fig. 6.

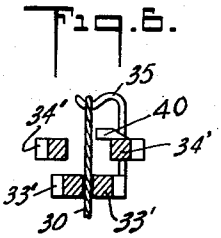


Fig. 7.

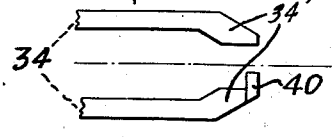
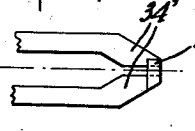


Fig. 8.



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Fig. 9.

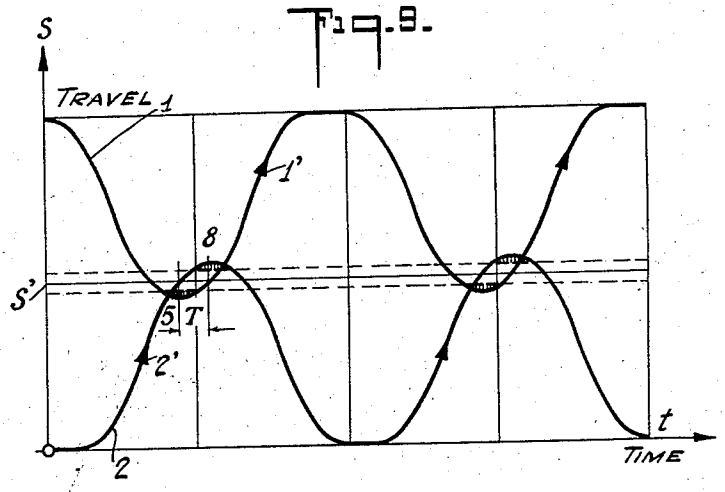


Fig. 10.

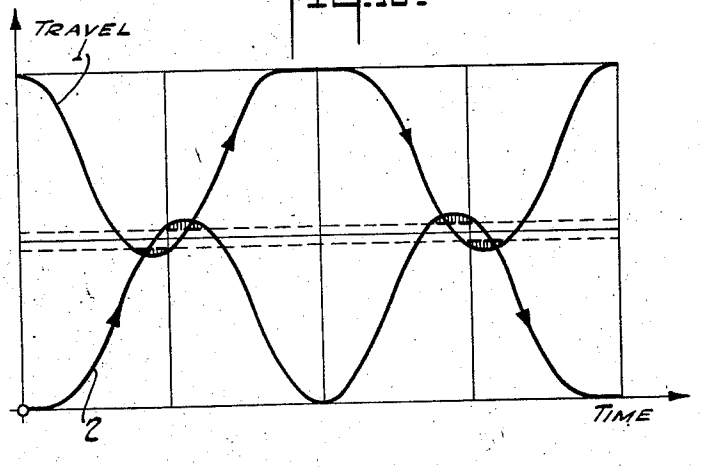
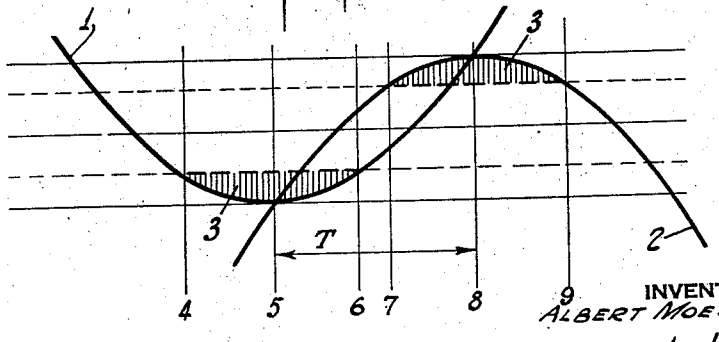


Fig. 11.



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THREAD INSERTION IN NIPPER LOOMS

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Application March 7, 1941, Serial No. 382,111
In Switzerland April 6, 1940

5 Claims. (Cl. 139—122)

The present invention relates to the construction of weft-thread grippers and gripper opening means in looms for weaving.

Positively-driven thread insertion means in looms for weaving have many great advantages in comparison with flying shuttles. They have, however, some drawbacks which become particularly apparent when a nipper head draws the weft thread through the shed by means of a rigid or flexible weft needle.

When a thread is brought from one end of the shed to the other by means of such a needle, the needle must be completely withdrawn from the shed before this thread is beaten up, i. e., for each working stroke it is necessary to make also an idle stroke, a procedure which entails loss of time and a reduction in the capacity of the loom.

In order to overcome this disadvantage, mechanisms have been proposed in which a weft needle projects into the shed simultaneously from both sides of the loom. One of these needles takes the thread to the middle of the shed, and the other brings this thread from the middle of the shed to the other side of the fabric. In this way no time is lost in making an idle stroke, since the thread is moved by the other needle when the first needle is making an idle stroke.

This, however, makes it necessary to transfer the thread very quickly from one weft needle to the other in the middle of the shed.

The invention relates to positively-driven thread insertion means in which the thread transfer is considerably facilitated. The needles projecting into the shed from the two sides of the loom, do not come simultaneously into their innermost positions in the shed; they grip at a position somewhat beyond the middle of the shed. In this way it is possible to control each weft needle by means of stationary spreader devices fixed on the slay.

By means of such a weft needle arrangement it is also rendered possible to lead the weft thread into the fabric from the left side and right side alternately; this is of advantage for forming a selvage at both sides of the fabric.

In the drawings:

Fig. 1 is a diagrammatic, isometric showing of weft-thread grippers and gripper opening means according to the invention.

Fig. 2 is a diagrammatic showing of the weft-thread grippers and gripper opening means shown in Fig. 1 in position just before a weft-thread is transferred from one gripper to the other.

Fig. 3 is a diagrammatic showing of the weft-thread grippers and gripper opening means shown in Fig. 1 in position when a weft-thread is transferred from one gripper to the other and temporarily held by both grippers.

Fig. 4 is a diagrammatic showing of the weft-thread grippers and gripper opening means shown in Fig. 1 in position just after a weft-thread has been transferred from one gripper to the other.

Fig. 5 is a diagrammatic side view of modified weft-thread grippers according to the invention in position just before a weft-thread is transferred from one gripper to the other gripper.

Fig. 6 is a cross sectional view of the arrangement shown in Fig. 5 taken along line VI—VI of said figure and looking in the direction of the arrows.

Fig. 7 is a top view of a portion of one pair of grippers shown in Fig. 5, the grippers being in open position.

Fig. 8 is a top view as per Fig. 7 with the grippers closed.

Fig. 9 is a diagram illustrating the movements of grippers according to the invention and indicating the relative positions at the period when the weft thread is transferred from one gripper to the other.

Fig. 10 is a diagram as per Fig. 9 illustrating a modified movement of the gripper needles.

Fig. 11 is a large scale showing of part of the motion diagrams as per Figs. 9 and 10.

Fig. 1 shows a part of a nipper loom which has stationary weft bobbins and in which the weft needles travel from both sides of the loom toward the center thereof. The weft needles 1 and 2 are each fitted with two spring clips 12, 13 and 14, 15, respectively, which are fixed at 16 to the nipper bar 10 and at 16' to the nipper bar 11 respectively. As shown in Fig. 4, nipper bars or thread guides 10 and 11 are connected to the nipper clips by means of rivets. The weft thread 30 is held either by gripper elements 17 or by elements 18. The clips 12, 13 and 14, 15 are provided with projections 19 and 20 respectively, by means of which it is possible to control the operating positions of members 17 and 18.

This control of the operation of members 17 and 18 is diagrammatically illustrated in Figs. 2–4.

In the operating position according to Fig. 2 the clip 18 is closed and holds the weft thread firmly. On the other hand the clip 17 is opened by the spreader device 21, which is fixed on the

slay 31, and it passes, astride, beyond the closed gripper elements 18.

Fig. 3 is a side view of the mechanism according to the invention with the moving elements in the position shown in Fig. 1. Both clipping elements 17 and 18 are closed at this moment.

Fig. 4 shows how the grippers 18 are opened by the spreader device 22 fixed on the slay 31; the grippers 18, astride, have already passed beyond the grippers 17 which are closed and carry the weft thread 30.

Figs. 5, 6, 7 and 8 show a modified weft needle construction, whereby the weft thread 30 is transferred from needle 33 to needle 34. In contrast to the embodiment of the invention shown in Figs. 1–4, the thread is taken over by needle 34 from above needle 33. For this purpose the thread is bent round a guide 35 and conducted perpendicularly to the direction of motion of the grippers. When the needle 33 reaches the middle of the shed, the weft thread 30 between the guide 35 and the grippers 33' is taken over by the needle 34 by means of its grippers 34'.

In order to assure that the weft thread is firmly held in the grippers, a hook or transverse member 36 and 40 respectively extending transversely to the gripping faces of said grippers is provided on one of each pair of gripper members 33' and 34'. Figs. 7 and 8 show grippers 34' and hook 40 in open and closed positions The weft thread 30 is taken hold of behind the hook 40 whereby grippers 34' are in the position shown in dash and dotted line in Fig. 5. When the two needles move away from each other, the weft thread 30 is bent over the hook 40, so that it cannot slip out of clip 34' because of its tension. The needle 34 leads the thread to the other side of the fabric. The needle 34 has a guide 37 which is utilized when the weft thread 30 is inserted by the needle 34 up to the middle of the shed and taken to the other side of the fabric by needle 33.

Fig. 6 shows a section on the line VI—VI of Fig. 5, i. e., a cross-section perpendicular to the plane of the fabric. The guide 35 is connected to the needle 33 and bends the weft thread 30 at a right angle to the direction of motion of the needle 33 in the vicinity of grippers 33'. Grippers 33' are closed whilst grippers 34' of the needle 34 are open. The guide or transverse member may be fixed either on the upper or the lower surface of the gripper elements.

The operation of the mechanism according to the invention, when transferring the thread, is illustrated by means of diagrams in Figs. 9–11.

In the stroke-time diagram (Fig. 9), curve 1 represents the motion of the weft needle working from one side of the loom, and curve 2 represents the motion of the weft needle working from the other side of the loom, the arrows 1' and 2' giving the direction of motion of the weft needles. Line S' indicates the center of the shed. When the weft needles at the moment carrying out the motion are at their innermost position in the shed as at 5 or 8, i. e., the point where the direction of motion changes, the clipping parts of the needle extend beyond each other. The two needles arrive at their innermost positions (points 5 and 8 respectively) with a certain time lag T. During the time lag T the gripper elements of the two needles extend beyond each other.

Fig. 10 diagrammatically illustrates a modified operation whereby the motions are such that the needle moving according to curve 1 arrives alternately first and last at the middle of the shed. When the needle moving according to curve 2 arrives at the middle of the shed, the needle moving according to curve 1 will already be back from its innermost position, i. e., will have already passed through a certain distance of its return motion. The weft thread is then brought into the middle of the shed by needle 2 and drawn from the middle of the shed to the other side of the fabric by needle 1. On the other hand, at the next insertion, the weft thread 30 is led by the needle 1 to the middle of the shed and then taken from the middle of the shed to the other side of the fabric by needle 2.

In Fig. 11 the overlapping of the motion of the two needles in the stroke-time diagram is shown in a larger scale. Before the weft needles reach their innermost positions (i. e., the points 5 and 8 respectively, where the direction of motion changes) the needle grippers are opened by one of the spreader devices 21 or 22 fixed on the slay 31. The times during which the spreader devices and the needle grippers are in contact with each other is represented by the shaded areas 3.

Up to point 4 the two needles approach each other with the grippers closed. From point 4 to point 5 the grippers of the weft needle 1 are open. At point 5 or near it, the grippers of weft needle 2 have already passed through between the opened grippers of weft needle 1 (Fig. 2). At point 6 the grippers of needle 2 are already beyond the grippers of needle 1; needle 1 will then close and firmly hold the weft thread 30 carried by the grippers of the needle 2 (Fig. 3). From point 7 onwards, the grippers of needle 2 will open and therefore release the weft thread from needle 2. At point 8 the grippers of needle 2 are opened so wide that the closed grippers of needle 1 can pass through the opened grippers of needle 2 (Fig. 4). From point 9 onwards the grippers of needles 1 and 2 are again closed, and the needles move apart. By this operation the weft thread brought by weft needle 2 up to the middle of the shed is transferred from needle 2 to needle 1 and taken by needle 1 from the middle of the shed to the other side of the fabric.

The needle that comes last into the middle of the shed brings the thread to the middle of the shed. The needle that comes first and without thread into the middle of the shed takes hold of the thread in the middle of the shed and draws it to the other end of the shed. It can therefore be seen that in Fig. 9 the thread is brought by the needle moving as per curve 2 into the middle of the shed. Curve 2 consequently pertains to a machine with a weft bobbin on only one side of the loom. Insertion is always made from the same side. In a loom operating according to Fig. 10 the weft thread is inserted alternately from both ends of the shed.

I claim:

1. In a loom for weaving having a slay and needles reciprocatingly moving from each side of the loom toward and from substantially the center of the loom, one needle carrying a weft thread toward substantially the center of the loom and the other needle carrying it to the other side of the loom, grippers provided at one end of each needle, and gripper opening means connected with said slay in the neighborhood of the center thereof and adapted to slidingly engage and to open the grippers of one of said needles before they meet the grippers of the

other needle substantially in the middle of the loom.

2. In a loom for weaving as set forth in claim 1, said grippers having thread gripping faces and being arranged in cooperating pairs, and a transverse member connected with one gripper of each of said pairs and extending transversely with respect to said faces and being adapted to prevent slipping of the weft thread gripped between said faces from said grippers.

3. In a loom for weaving having a slay and needles reciprocatingly moving from each side of the loom toward and from substantially the center thereof, one needle carrying a weft thread toward substantially the center of the loom and the other needle carrying it to the other side of the loom, grippers provided at one end of each needle, gripper opening means connected with said slay in the neighborhood of the center thereof and adapted to slidingly engage and to open the grippers of one of said needles before they meet the grippers of the other needle substantially in the middle of the loom, and weft thread guide means connected with said needles and being adapted to hold the weft thread gripped by the grippers of one needle in a position coinciding with the position of the grippers of the other needle at the time the thread is gripped by the grippers of the other needle.

4. In a loom for weaving having a slay and needles reciprocatingly moving from each side of the loom toward and from substantially the center thereof, one needle carrying a weft thread toward substantially the center of the loom and the other needle carrying it to the other side of the loom, grippers provided at one end of each needle, gripper opening means connected with said slay in the neighborhood of the center thereof and adapted to slidingly engage and to open the grippers of one of said needles before they meet the grippers of the other needle substantially in the middle of the loom, and weft thread guide means connected with said needles and being adapted to hold the weft thread gripped by the grippers of one needle in a position substantially at right angles to the direction of movement of the grippers and in the immediate neighborhood thereof and coinciding with the position of the grippers of the other needle at the time the thread is gripped by the grippers of the other needle.

5. In a loom for weaving having a slay and needles reciprocatingly moving from one side of the loom toward and from substantially the center thereof, one needle carrying a weft thread toward substantially the center of the loom and the other needle carrying it to the other side of the loom, grippers provided at one end of each needle, gripper opening means connected with said slay in the immediate neighborhood thereof and adapted to slidingly engage and to open the grippers of one of said needles before they meet the grippers of the other needle substantially in the middle of the loom, weft thread guide means connected with said needles and being adapted to hold the weft thread gripped by the grippers of one needle in a position substantially at right angles to the direction of movement of the grippers and in the immediate neighborhood thereof and coinciding with the position of the grippers of the other needle at the time the thread is gripped by the grippers of the other needle, said grippers having thread gripping faces and being arranged in cooperating pairs, and a transverse member connected with the end of one gripper of each of said pairs and extending transversely with respect to said faces and being adapted to prevent slipping of the weft thread gripped between said faces from said grippers.

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