

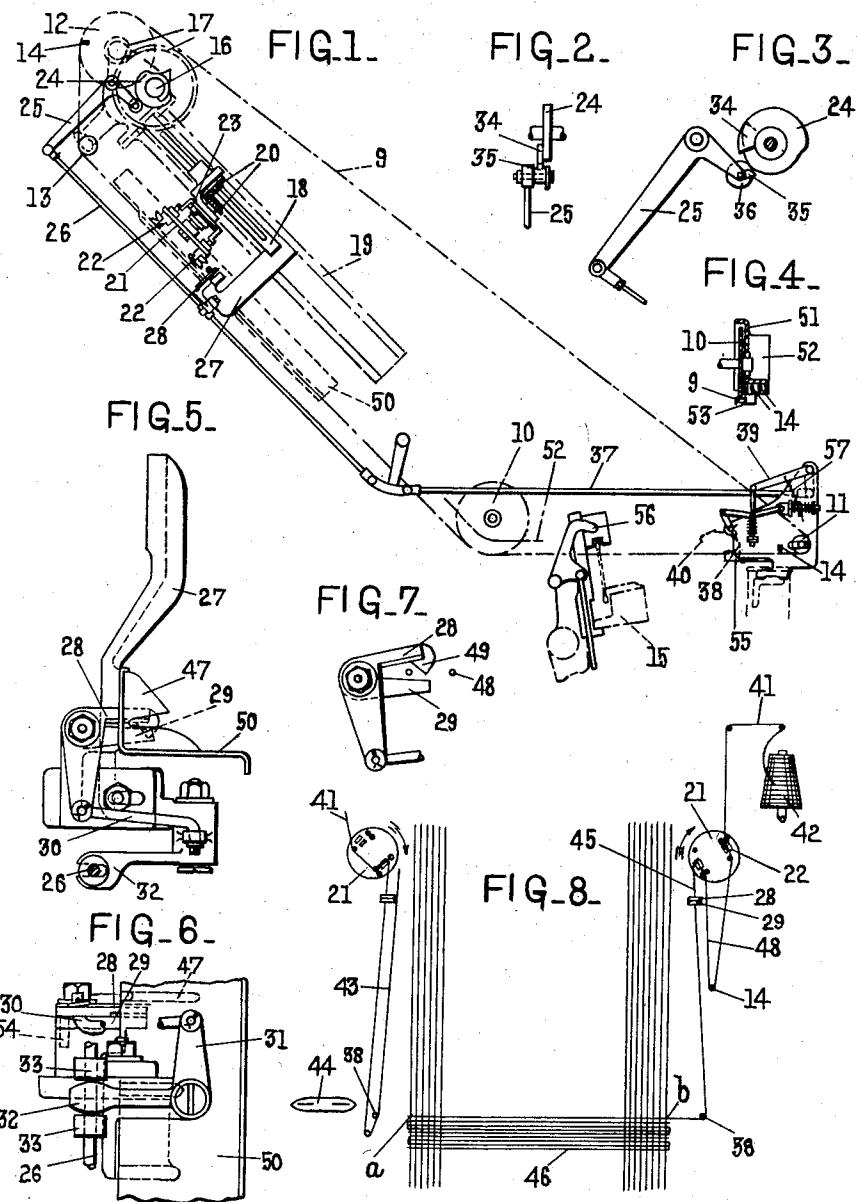
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LOOM HAVING STATIONARY WEFT SUPPLIES

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## LOOM HAVING STATIONARY WEFT SUPPLIES

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This invention relates to looms having stationary weft supplies, i. e. supplies which do not pass through the shed, and in particular to such looms in which weft is drawn at a side of the loom into the form of a loop of a length sufficient to furnish two picks, the limbs of the loop being inserted in turn by means of a dummy shuttle or other device into separate sheds so as to form a "hairpin" of weft, the bight of the loop forming the selvedge of the fabric.

With this type of weft insertion, it is necessary to arrange that different lengths of weft are available for engagement by the inserting means on the first and second picks respectively, since, in view of the fact that loop formation must necessarily take place at some distance from the edge of the fabric, on the first pick a length of weft must be available which is equal to the length of the pick, plus approximately the distance of the formed loop from the edge of the fabric, while the length of weft connected to the first pick and extending from the edge of the fabric to the remaining limb of the loop is available to form the second pick.

It is most convenient, however, to draw the weft loop with substantially equal lengths of limb, such method being described in U. S. application S. No. 484,785 filed 27th September, 1930, in which the weft is seized by a number (preferably two) of trapping devices which are movable so as successively to occupy weft-engaging position and allow the weft to be drawn by a travelling member into loop form for presentation to a dummy shuttle or other inserting means. It is advisable to keep the trapping devices close together, to make engagement of the weft by the travelling member quite certain, as well as to simplify the loop-forming mechanism, and the arrangement described in the above-mentioned specification of two trapping devices mounted on a member which rotates to bring them into position is a convenient one for this purpose.

The principal object of the present invention is, therefore, to enable the different lengths of weft to be available on the two picks from each loop while permitting the loops to be drawn with limbs of substantially equal length.

According to the invention, cutting means are so arranged with respect to the trapping devices that an already-formed loop can be severed from the supply at a point which cuts the limb of the loop connected to the supply short of its full length, so leaving a corresponding length of weft available to increase the length of the other limb of the loop next to be formed.

With the form of apparatus described in U. S. application S. No. 484,785, a single cutter may be used, since by the rotation of the trapping devices the second limbs of successive loops occupy the same position in turn and can be severed by the one cutter. Further, since severing of a loop from the supply must take place immediately before the second loop is to be inserted, and at the same time a tension finger which has been within the weft loop requires to be withdrawn, the same operating means can be used for both the cutter and the finger.

The cutter is preferably adjustable in position so as to enable the lengths of the loop limbs to be varied in accordance with the width of fabric to be woven, it having to be noted in this connection that the difference required in the loop lengths is dependent on the fabric width in view of the change in the distance of the loop from the edge of the fabric consequent on a change in fabric width. It is not desirable however to have the cutter leave a weft extending to such a length that it is likely to be caught in the mechanism, and therefore any considerable difference in the limbs of the loop can be provided by adjustment of the point of release of the loop. For this purpose, the sprocket over or round which the chain or other flexible member carrying the weft-engaging travelling member may be mounted on a journal which is adjustable along a slot in the sprocket mounting the cutter can then be moved for minor adjustment of the limb lengths.

Cutting of the weft can conveniently be effected by means of a cam or cams driven by the mechanism used for operating the trapping devices and the travelling member or members. For example, where a single cutter is used in conjunction with a pair of trapping devices mounted on a rotatable member, a cam may be mounted on the shaft of a gear box from which the trapping devices may be moved intermittently faster and slower as described in application Ser. No. 585,479 filed Jan. 8, 1932, this cam being connected by lever and link mechanism serving also to operate the tension finger. The gear box may be driven by the chain carrying the travelling member or members or may itself drive the chain.

In order to ensure accuracy in the lengths of the loop limbs, the point of release may be controlled by the use of guide means as described in application Ser. No. 580,617 filed Dec. 12, 1931, to prevent vibration of the chain as it approaches and while it passes round the sprocket where release is effected. The chain preferably com-

mences its backward run immediately on leaving this sprocket, thus giving a large angle of movement round the sprocket and a correspondingly large amount of time for release of the weft from the travelling member.

The invention will now be described with reference to the accompanying drawing, but it is to be understood that this description is given by way of example only and is in no respect limitative.

Fig. 1 shows a general arrangement of the mechanism according to the invention;

Figs. 2 and 3 show details of the operating cam;

Fig. 4 is a sectional view of further details;

Figs. 5 to 7 show to an enlarged scale the cutting mechanism employed; and

Fig. 8 shows diagrammatically the operation of the mechanism.

Referring to Fig. 1, 9 is an endless chain passing round a driving sprocket 10, guide sprockets 11 and 12, and a tensioning sprocket 13. The chain carries two pegs 14 at equal distances apart, these pegs proceeding down the lower run of the chain, round the sprocket 10 and along a horizontal path some distance above the shuttle race 15. The sprocket 12 drives a shaft 16 through gears 17 and the shaft 16 by means of gears (not shown) drives a shaft 18 carried on a frame 19 running parallel to the chain between the sprockets 13, 10. Means for driving the shaft 18 from the shaft 16 are described in detail in application Ser. No. 585,479. Bevel gears 20 enable the shaft 18 to rotate a disc 21 carrying two trapping devices 22, a fixed cam 23 serving to open and close the trapping devices 22 in turn as the disc 21 rotates.

A cam 24 on the shaft 16 operates a bell-crank lever 25 connected to a rod 26 for the purpose of operating a cutting mechanism carried by a bracket 27 from the frame 19.

This cutting mechanism, which is shown in detail in Figs. 5 to 7, comprises a moving blade 28 and a fixed blade 29. The blade 28 is formed as a bell-crank which is connected by a link 30 to a bell-crank lever 31 whose arm 32 terminates as a fork embracing the rod 26 between collars 33. Thus an upward movement of the rod 26 under the action of the cam 24 causes the blades 28, 29 to open. Closure of the knives is effected suddenly by a quick drop in the cam 24. This quick drop is formed by means of a plate 34 secured to one side of the cam 24 and adapted to engage a nib 35 carried by the follower end of the bell-crank 25. The follower roller 36 is thus lifted away from the cam 24 just prior to the closure of the knife and the knife is then allowed to close quickly as the plate 34 rotates the nib 35 and the roller 36 then re-engages with the cam. Since the nib 35 only makes contact with the plate 34 for a brief interval, and is free while the roller 36 engages the cam, the nib is relieved from excessive wear. The fixed blade 29 is held against movement by a pin 34 held in the bracket 27 and passing through a hole in the blade.

The rod 26 is also connected to a further rod 37 which actuates a finger 38 through the lever and toggle mechanism 39 as described in U. S. application S. No. 561,839 filed 9th September, 1931. Under the action of a spring 57, the finger 38 is lifted to the position shown at 40 at the same instant as the blade 28 closes on the blade 29. The operation of the mechanism is as follows:—

One end of a weft thread 41 proceeding from

a package 42 at the side of the loom is held in one of the trapping devices 22 and extends therefrom through the other trapping device in the disc 21, the second device being held open by the cam 23. One of the pegs 14 in the chain 9 passes between the trapping device and so engages the weft to draw it out into a loop, one such loop being shown half formed at the right-hand side of Fig. 8 and another loop being shown fully formed at the left-hand side of the figure. During drawing of the loop the weft passes freely through the open trapping device 22. When the peg 14 has reached the end of its travel, the second trapping device is closed to seize its end of the loop, and the peg 14 is released from the bight of the loop by the turning of the chain 9 round the sprocket 11.

Just prior to release of the bight of the loop, the finger 38 enters the loop under the operation of the cam 24. The limb 43 of the loop which is nearer the edge of the warps is then presented by a depresser 56 to a dummy shuttle 44 and is picked into the shed. The weft then extending from the shed passes round the finger 38 to the disc 21 where it is held in one of the trapping devices. It follows therefore that the amount of weft required to be available in the remainder of the loop between the finger 38 and the disc 21 must be less than the pick length  $a-b$  by the amount extending from the point  $b$  to the finger 38. Accordingly the cutting blades 28, 29 are so disposed with respect to the finger 38 that on operation of the cam 24 they sever the required length. Then, on release of the finger 38 from the loop, the length of weft inserted by the shuttle 44 is sufficient to extend through the full width of the warps to form the second limb of a "hairpin" of weft whose first limb was formed by the first pick inserted from the loop.

It will also be seen that the amount of weft which must be available for presentation to the shuttle on insertion of the first pick must exceed the pick length  $a-b$  by the amount required to cover the distance between the point  $b$  and the finger 38. Such an excess is provided by suitable adjustment of the cutting blades 28, 29 from the trapping device 22 in which the second limb of the loop is held at the time when cutting is to take place. This precise length can be obtained by adjustment of the positions of the cutting device and the disc 21 in the frame 19. It follows that after the weft is cut, a length 45 is left extending beyond the trapping device in which the weft is held while the next loop is being formed by the peg 14. After formation of the loop and release of that trapping device the length 45 is drawn through the device when the first pick 43 is being inserted.

It will be understood that similar weft drawing and cutting devices are provided at both sides of the loom for operation in sequence so that a pick inserted from one side of the loom is followed by a pick from the other side to provide the hairpin arrangement of weft as shown at 46 in Fig. 8, the bights of the hairpins serving to form the selvedges of the fabric.

In order to lead the weft to be severed between the blades 28, 29 a notched guide 47 is provided adjacent to the blades. Since the rotation of the disc 21 brings one limb 48 of a loop under formation into proximity to the cutting device, the moving blade 28 is provided with a beak 49 which by closing the gap between the blades prevents entry of the length 48 between the blades, and ensures

that only the loop-limb to be severed enters the cutter.

A guard 50 is provided along the length of the chain to prevent the weft fouling the chain especially while the loop limbs are being drawn by the shuttle 44 away from the loop forming mechanism into the shed. In order to carry the loops past the sprocket 10 the sprocket is provided with a housing 51 as shown in Fig. 4, this housing being provided with a guard 52 under which the loop is drawn by the pegs 14. The pegs 14 are carried by brackets 53 from one side of the chain 9, either a single peg being used for loop formation as shown in Fig. 8, or a pair of such pegs 15 may be employed as shown in Fig. 4.

In order to steady the chain near the sprocket 11 and to control accurately the release of the loop from the peg or pegs 14, a tunnel 55 or other guide means as described in application Ser. No. 20 580,617 may be provided.

What I claim and desire to secure by Letters Patent is:—

1. A loom having a stationary weft supply, said loom comprising a pair of trapping devices, a drawing member adapted to draw between said trapping devices a loop of weft sufficient for two picks, one limb of said loop being connected to the supply, and thread cutting means adapted to receive the limb of the loop connected to the supply and so positioned that the said limb is severed at a point spaced apart from its trapping device on the side remote from the supply.

2. A loom having a stationary weft supply, said loom comprising a pair of movable trapping devices, a drawing member adapted to draw between said movable trapping devices a loop of weft sufficient for two picks, one limb of said loop being connected to the supply, and thread cutting means into engagement with which the limb of the loop connected to the supply is carried by said movable trapping devices and so positioned that the said limb is severed at a point spaced apart from its trapping device on the side remote from the supply.

3. A loom having a stationary weft supply, said loom comprising a pair of trapping devices, a drawing member adapted to draw between said trapping devices a loop of weft sufficient for two picks, one limb of said loop being connected to the supply, and a single thread-cutter adapted to sever successive loops of weft from the supply and so positioned that the said loops are severed at a point spaced apart from the respective trapping devices in which each loop is held, and on the side remote from the supply.

4. A loom having a stationary weft supply, said loom comprising a pair of movable trapping devices, a drawing member adapted to draw between said movable trapping devices a loop of weft sufficient for two picks, one limb of said loop being connected to the supply, and a single thread-cutter into engagement with which successive loops are carried by said movable trapping

devices and so positioned that the said loops are severed at a point spaced apart from the respective trapping devices in which each loop is held and on the side remote from the supply.

5. A loom having a stationary weft supply, 80 said loom comprising a pair of trapping devices, a drawing member adapted to draw between said trapping devices a loop of weft sufficient for two picks, one limb of said loop being connected to the supply, a tension finger adapted temporarily to engage the bight of said loop, thread cutting means so positioned as to receive the limb of the loop connected to the supply and to sever it at a point spaced apart from its trapping device on the side remote from the supply, and common 90 means adapted to release the tension finger from the bight of the loop and to actuate the thread-cutting means.

6. A loom having a stationary weft supply, 94 said loom comprising a pair of trapping devices, a drawing member adapted to draw between said trapping devices a loop of weft sufficient for two picks, one limb of said loop being connected to the supply, a tension finger adapted temporarily to engage the bight of said loop, a single thread- 100 cutter into engagement with which successive loops are carried and so positioned that the said loops are severed at a point spaced apart from the respective trapping devices in which each loop is held and on the side remote from the supply, 104 and common means adapted to release the tension finger from the bight of the loop and to actuate the single thread-cutter.

7. A loom having a stationary weft supply, 110 said loom comprising a pair of movable trapping devices, a drawing member adapted to draw between said movable trapping devices a loop of weft sufficient for two picks, one limb of said loop being connected to the supply, thread cutting means into engagement with which the limb 114 of the loop connected to the supply is carried by said movable trapping devices and so positioned that the said limb is severed at a point spaced apart from its trapping device on the side remote from the supply, and guide means adapted to 120 assist the movement of the trapping devices in carrying the limb to be severed into engagement with the thread cutting means.

8. A loom having a stationary weft supply, 124 said loom comprising a pair of movable trapping devices, a drawing member adapted to draw between said movable trapping devices a loop of weft sufficient for two picks, one limb of said loop being connected to the supply, thread cutting means into engagement with which the limb of 130 the loop connected to the supply is carried by said movable trapping devices and so positioned that the said limb is severed at a point spaced apart from its trapping device on the side remote from the supply, and means adapted to ensure 134 that only the loop limb to be severed is engaged by the cutting means.

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