Nov. 20, 1945. R. G. TURNER 2,389,471

THREAD CUTTER FOR LOOMS

Filed Dec. 2, 1944

Fig. 1

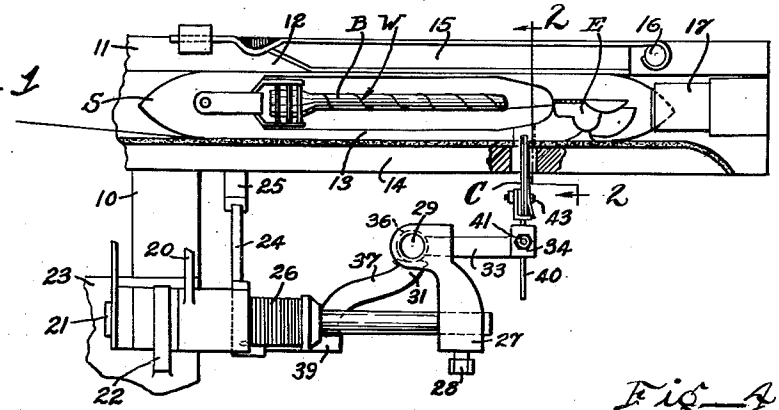


Fig. 4

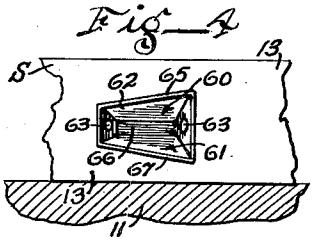


Fig. 2

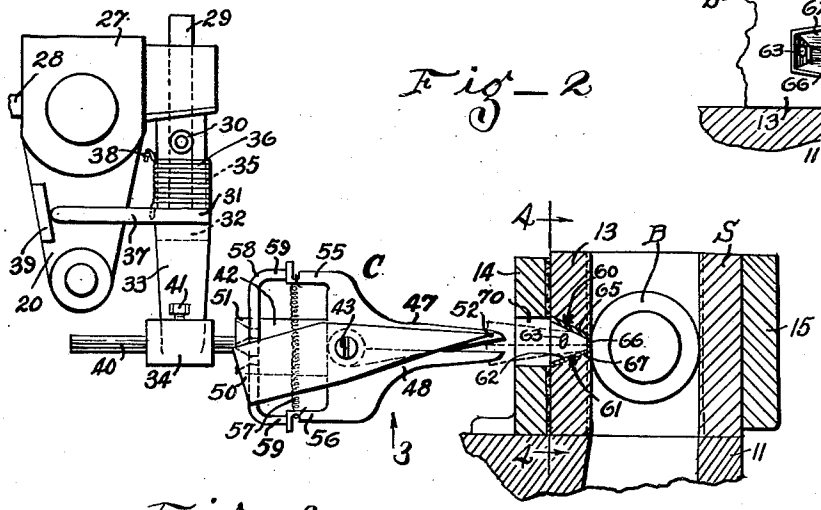


Fig. 3

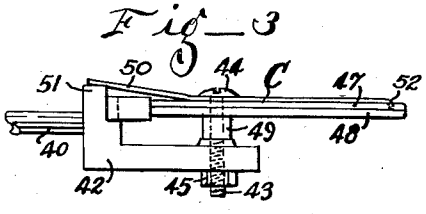


Fig. 6

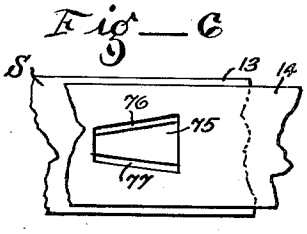
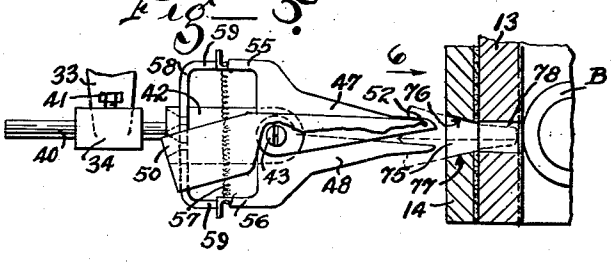


Fig. 5



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Patented Nov. 20, 1945 2,389,471

UNITED STATES PATENT OFFICE

2,389,471

THREAD CUTTER FOR LOOMS

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Application December 2, 1944, Serial No. 566,301

12 Claims. (Cl. 139—267)

This invention relates to thread cutters for looms and it is the general object of the invention to provide cutter mechanism the jaws of which will be closed by cam surfaces formed on a part moving forwardly with the lay, such as the shuttle or shuttle box front.

At the time a bobbin is changed in a weft replenishing loom a thread extends from the depleted bobbin through the shuttle eye and along the front wall of the shuttle to the selvage. It is desirable to cut and remove this thread to prevent it from being drawn into the warp shed. It is an important object of my present invention to provide a thread cutting mechanism having relatively movable jaws which enter the shuttle box and are open at the start of the cutting operation, but are closed by cooperating parts or surfaces on either the shuttle box front or the shuttle. By this arrangement it is unnecessary to use abutments or the like on the lay, and cutting can be effected by a part which is very close to the thread to be cut.

The cutting mechanism is under control of some part of the weft replenishing mechanism, such as the transferrer arm, and is normally held forward in inactive position, but is moved rearwardly preparatory to cutting as the lay advances on a transferring beat. The cutter is so mounted that it moves angularly and laterally in a direction toward the adjacent end of the lay during the latter part of its angular movement. In order that the cutter may move laterally with a minimum of resistance it is another object of my invention to have the operating cam surfaces divergent in the direction of lateral movement of the cutter.

The amount of vertical motion which can be imparted to a cutter blade by an advancing surface on the lay is determined partly at least by the back and forth thickness of the member on which the surface is carried. In order that the maximum relative vertical movement of the cutter blades may be attained I mount both of them for vertical pivotal movement, and dispose them so that they may be moved by their respective cam surfaces.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth.

In the accompanying drawing, wherein I have set forth two forms of my invention,

Fig. 1 is a plan view partly in section showing the preferred form of my invention with the cutter and shuttle in cutting relationship such as exists when the lay is on front center on a transferring beat of the loom,

Fig. 2 is an enlarged vertical section on line 2—2, Fig. 1,

Fig. 3 is a bottom plan view looking in the direction of arrow 3, Fig. 2,

Fig. 4 is a vertical section on line 4—4, Fig. 2 showing the cam operating surfaces mounted on the shuttle,

Fig. 5 is a view similar to a part of Fig. 2 but showing the modified form of the invention in which the cutter mechanism is operated by a part of the shuttle box structure, and

Fig. 6 is a detail front elevation of the box front looking in the direction of arrow 6, Fig. 5.

Referring particularly to Fig. 1, I have indicated a loom frame 10, lay 11, and a shuttle box 12 thereon to receive a shuttle S containing a bobbin B on which is wound the weft W. The shuttle has an eye E and the thread from the bobbin ordinarily extends through the eye and then along the front wall 13 of the shuttle behind the front box forming element 14 on the lay. In the present instance the element 14 is secured to the lay and the binder 15 is behind the shuttle and pivoted as at 16. The usual picker mechanism indicated at 17 may be employed for moving the shuttle out of the box.

The weft replenishing mechanism not fully illustrated includes in its construction a transferrer arm 20 pivoted on a stud 21 fixed to the foot 22 of the replenishing mechanism secured to the breast beam 23. The transferrer arm may be actuated by a latch 24 controlled to engage a bunter 25 on the lay on transferring beats of the loom. The stud 21 is extended to the right of the transferrer arm as viewed in Fig. 1 and has wound therearound a heavy torsion spring 26 the purpose of which is to hold the transferrer arm normally in raised inoperative position. At the time of transfer the arm 20 descends against the action of spring 26.

Mounted on an extension of stud 21 is a carrier 27 held in adjusted position along the stud by a set screw 28. This carrier receives an upright stem 29 held in vertically and angularly adjusted position by a set screw 30 in the carrier. A lever 31 rests on a head 32 on the bottom of stem 29 and has an arm 33 provided with a hub 34. Lever 31 has a hub 35 surrounded by a coiled spring 36 one end of which is connected to an arm 37 of lever 31 and the other end of which is connected to a pin 38 fixed with respect to the carrier 27. Ordinarily the spring 36 holds arm 37 against a stop 39 on the transferrer arm 20 and

the hub 34 is in forward position. At the time of transfer the stop 39 moves forwardly and spring 36 is free to move the hub 34 rearwardly around the stem 29 as a pivot.

The matter thus far described, except as noted hereinafter, forms no part of my present invention and may be made as shown for instance in Payne Patent No. 1,881,920, except that the particular type of cutter and shuttle shown in that patent is replaced by the cutter mechanism about to be described.

In carrying my invention into effect I provide a cutter mechanism designated generally at C and having a forwardly extending rod 40 held in hub 34 for backward and forward adjustment by a set screw 41. Secured to the rear end of the rod is a head 42 into which is threaded a stud 43. The stud has a screw driver head 44 and is held in fixed position on head 42 by nut 45. Mounted on the stud are top and bottom cutter blades 47 and 48, respectively, the latter having a hub 49 through which the stud 43 passes. A flat spring 50 is held under the head 44 of the stud and has the forward end thereof in engagement with a shoulder 51 on the head 42 and has the rear end thereof in engagement as at 52 with the upper cutter blade 47. Spring 50 holds blade 47 firmly against blade 48 and swings with the upper blade.

The top blade 47 has a forwardly extending upper finger 55 while the bottom blade 48 has a similar lower finger 56, and a light tension spring 57 extends between the fingers and normally tends to hold the cutter blades in the open position shown in full lines in Fig. 2. A stop 58 secured to head 42 has top and bottom horizontal arms 59 for engagement with the fingers 55 and 56, and under normal conditions the spring 57 holds the fingers 55 and 56 against their respective stop arms as shown in Fig. 2. The cutter mechanism forming part of my invention thus far described is used with both forms of the invention, and may be similar to the structure shown in my co-pending application Serial No. 551,288, filed August 26, 1944.

In the preferred form of my invention I equip the front wall 13 of the shuttle S with upper and lower inclined operating surfaces located slightly to the left of the shuttle eye E, as indicated in Fig. 1. These surfaces, designated at 60 and 61, respectively, are formed on a small metallic unit 62 which sets in the front wall of the shuttle and is held therein by screws 63, see Figs. 2 and 4. The unit has a top wall 65 which is inclined downwardly and rearwardly and leads to a vertical wall 66 which extends down to a bottom wall 67 inclined downwardly and forwardly. The degree of inclination of the surfaces 60 and 61 on the walls 65 and 67, respectively, is preferably the same. The box front 14 is provided with a slot 70 which registers vertically with the unit 62 and therefore permits engagement of the latter by the cutter blades when the shuttle is boxed. Ordinarily the weft thread to be cut will extend in front of the unit 62 so that the open space between walls 65 and 67 will lie behind the thread.

In the operation of the preferred form of the invention the cutter mechanism is normally in its inoperative forward position shown in full lines in Fig. 2 due to the fact that stop 39 is to the rear. Under these conditions the cutter blades will not engage surfaces 60 and 61 when the lay is on front center position. When a transfer operation is called the cutter mechanism C will move rearwardly as already described and as the lay advances the top blade 47 will engage surface 60 and be moved downwardly thereby, while the bottom blade 48 will engage surface 61 and be raised. Both blades are therefore caused to approach each other and cross each other to cut the thread as the blades move to the position indicated in dotted lines in Fig. 2.

The blades 47 and 48 may be closed while the lay is still a short distance from front center, in which case the rear wall 66 of the unit 62 will engage the blades and move the mechanism C forwardly. During this movement the cutter slides laterally along wall 66 and around stem 29 toward the adjacent end of the lay. In order to facilitate this lateral movement of the blades the walls 65 and 67 diverge slightly in the direction in which the cutter mechanism moves, that is, toward the adjacent end of the lay.

The amount of divergence is slight due to the fact that the surfaces 60 and 61 must be able to operate blades 47 and 48 for all positions of the shuttle in box 12 in which transfer can occur. When the shuttle is not fully boxed the blades will engage those parts of surfaces 60 and 61 spaced somewhat from the left end of unit 62, whereas when the shuttle is fully boxed the engagement will occur near the left end of the unit. Under both of these conditions the surfaces 60 and 61 will be able to effect a cutting operation of the blades.

In the modified form of the invention I form the inclined operating surfaces for the cutter blades on the shuttle box forming member 14. As indicated in Fig. 5 the member 14 is provided with a slot 75 having inclined surfaces 76 and 77 which are inclined downwardly and upwardly, respectively, and also rearwardly. The shuttle has a slot 78 in its front wall which registers with the slot 75 when the shuttle is properly boxed. In this modified form of the invention the blades 47 and 48 engage the surfaces 76 and 77, respectively, as the lay advances on a replenishing beat. The rear ends of the blades 47 and 48 are so formed that they can penetrate the slot 78 a considerable distance beyond the front surface of the front shuttle wall 13, thereby insuring a proper cutting operation with respect to the weft thread. In the modified form of the invention the surfaces 76 and 77 diverge slightly toward the adjacent end of the lay as indicated in Fig. 6, this form of the invention being similar to the preferred form so far as divergence of the operating or inclined cam surfaces is concerned.

During the cutting operation in both forms of the invention the fingers 55 and 56 move apart and also away from their stop arms 59, thereby stretching spring 57, but as the lay recedes the spring 57 restores the cutter blades to their normal positions shown in full lines in Fig. 2. The stop arms 59 cooperate with fingers 55 and 56 to locate the rear ends of the blades for proper entry between the operating inclined surfaces.

The relation between the springs 26, 36 and 57 must be such as to permit closure of the cutter blades 47 and 48 to complete a cutting operation before the cutter moves as a whole around stem 29. In order to effect this result spring 36 should preferably be stronger than spring 57, the latter yielding to permit closing of the cutter blades while the cutter is held in its rear position by spring 36. It is also obvious that spring 26 must be strong enough to overpower spring 36 at the end of a replenishing operation so that the cutting mechanism may be moved to its inactive forward position.

From the foregoing it will be seen that I have

provided simple cutting mechanism for a weft replenishing loom wherein the cutter blades which sever the welt of the outgoing bobbin are caused to close by a camming operation effected by inclined surfaces on a part advancing with the lay near the thread. In the preferred form of the invention these cam or inclined surfaces are mounted on the shuttle, while in the modified form they are located on a shuttle box forming member. In either case the thread to be cut extends along the part which carries the inclined surfaces. In both forms of the invention the operating inclined surfaces diverge toward the adjacent end of the lay to relieve the pressure between the cutter blades and allow them to slide laterally along their respective surfaces. It will also be noted that both blades are mounted for rotation about the stud 43 so that each partakes of a vertical motion, thereby producing a maximum relative movement of the blades to effect cutting in a relatively short forward movement of the lay.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In thread cutting mechanism for a loom having a reciprocating lay provided with a thread to be cut, a pair of cutter blades in open position to receive the thread but movable toward each other to closed position to cut the thread, and means on the lay presenting an upper surface above the thread inclined downwardly and rearwardly and a lower surface below the thread inclined upwardly and rearwardly, said surfaces due to forward movement of the lay engaging said cutter blades and causing them to move to closed position subsequent to movement of the thread to a position between said blades when the latter are in open position.

2. In a thread cutting mechanism for a loom having a reciprocating lay provided with a horizontal thread to be cut, a pair of cutter blades normally separated vertically and between which the thread extends when the thread is to be cut, means mounting said blades for movement in a vertical plane toward each other, and means mounted on the lay and having two surfaces, one above and the other below the thread, said surfaces being oppositely inclined in the plane in which the blades move and positioned for engagement with said blades to effect movement of the latter to cut the thread as the lay moves toward said blades.

3. In thread cutting mechanism for a loom having a reciprocating lay provided with a shuttle along the front side of which extends a thread to be cut, cutter mechanism comprising two normally spaced blades capable of relative vertical movement with respect to each other to cut the thread, and vertically spaced means on the shuttle above and below the thread engaging the blades and causing the latter to move toward each other subsequent to movement of the thread between the blades to cut said thread during forward movement of the lay.

4. In a thread cutting mechanism for a loom having a reciprocating lay provided with a shuttle along the front wall of which extends a thread to be cut, a pair of cutter blades pivotally mounted for vertical movement relatively to each other and normally held apart to receive the thread, and cam means mounted on the shuttle to the rear of the thread and above and below the thread to engage said blades and cause movement thereof toward each other subsequent to movement of the thread between said blades to cut said thread as the lay moves toward said blades.

5. In thread cutting mechanism for a loom having a reciprocating lay provided with a shuttle along the front wall of which extends a thread to be cut, cutter mechanism comprising blades normally separated to receive the thread but capable of relative vertical movement with respect to each other to cut the thread, a unit carried by the shuttle behind the thread and having inclined surfaces positioned above and below the thread to engage the blades and cause the latter to move together to cut the thread as the lay moves toward said blades and subsequent to movement of the thread to a position between said blades.

6. In thread cutting mechanism for a loom having a reciprocating lay provided with a thread to be cut, a shuttle box forming member mounted on and reciprocating with the lay, thread cutting mechanism comprising cutter blades separated from each other to receive the thread and capable of relative vertical movement toward each other to cut the thread, and means on said box forming member comprising inclined surfaces above and below the thread to engage said blades and cause the same to cut the thread subsequent to movement of the thread between said blades as the lay moves toward said cutter mechanism.

7. In thread cutter mechanism for a loom having a reciprocating lay provided with a shuttle along which extends a thread to be cut, a shuttle box front forming member carried by the lay in front of the thread, cutter mechanism comprising blades in open position to receive the thread but movable relatively to each other to closed position to cut the thread, said box front forming member having a slot therein to receive said blades, and means within said slot and on said member engaging the cutter mechanism to cause relative movement of said blades subsequent to movement of the thread to a position between the cutter blades and as the lay advances.

8. A shuttle for cooperation with the cutter blades of thread cutting mechanism, said shuttle having an eye from which a thread extends along a front shuttle wall, and means carried by said shuttle presenting two oppositely inclined surfaces, one above and the other below the thread, for engagement with the blades of the cutting mechanism.

9. A shuttle for cooperation with a thread cutting mechanism having normally open blades, said shuttle having a slot in a wall thereof across which extends a thread, and means carried by the shuttle behind said thread having a downwardly and rearwardly inclined surface above the thread and having also an upwardly and rearwardly inclined surface below the thread, said inclined surfaces being for the purpose of engaging the blades.

10. In a shuttle for cooperation with a thread cutting mechanism having a pair of relatively movable blades, said shuttle having a front wall along which a weft thread extends, and a unit secured to said wall extending above and below and behind the thread and presenting vertically and rearwardly inclined surfaces to engage the blades and cause the latter to have a cutting op-

eration as the shuttle is moved toward said cutting mechanism.

11. In thread cutting mechanism for a loom having a reciprocating lay provided with a thread to be cut, thread cutter blades mounted for relative movement toward each other and movable bodily in the direction of the length of the lay, and means carried by the lay presenting vertically and rearwardly inclined surfaces for engagement with said blades to cause the latter to cut the thread as the lay moves toward the cutter mechanism, said surfaces diverging in the direction in which the cutter blades move bodily.

12. In thread cutting mechanism for a loom having a reciprocating lay provided with a shuttle along the front side of which extends a thread to be cut, cutter mechanism comprising two normally spaced blades capable of relative vertical movement with respect to each other to cut the thread, means mounting the cutter mechanism for movement toward the adjacent end of the lay, and means on the shuttle having two vertically spaced surfaces inclined rearwardly and vertically, said surfaces being oppositely inclined and positioned for engagement with the blade to cause the latter to cut the thread as the lay beats up, and said inclined surfaces diverging from each other in a direction toward the adjacent end of the lay.

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