Dec. 24, 1940. R. G. TURNER 2,226,290

THREAD CUTTING MECHANISM FOR WEFT REPLENISHING LOOMS

Filed July 8, 1940

FIG. 1

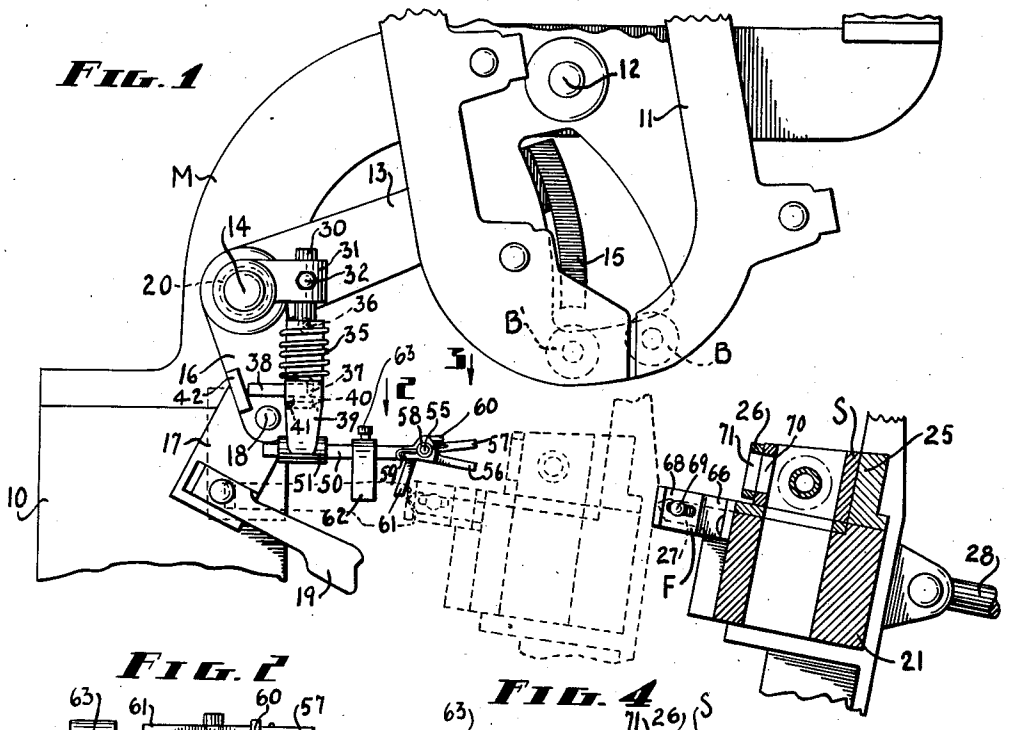


FIG. 2

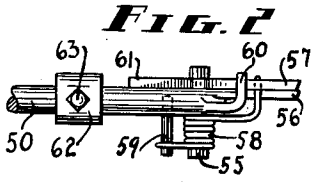


FIG. 4

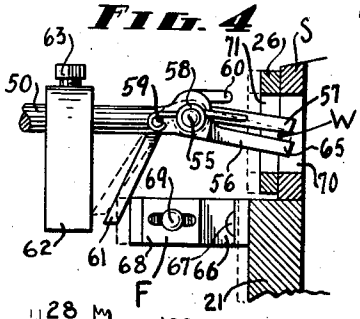


FIG. 6

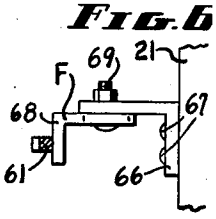
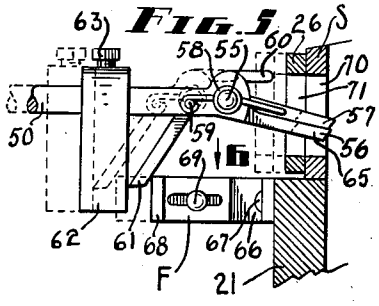


FIG. 5



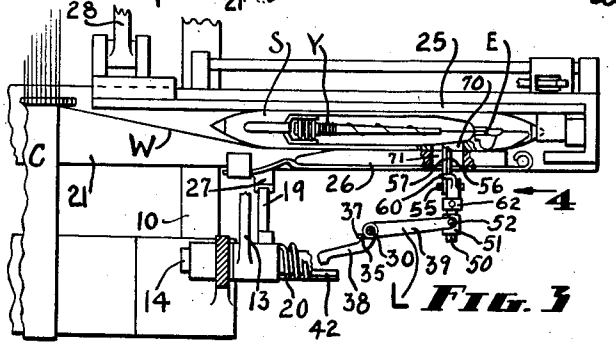


FIG. 3

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Patented Dec. 24, 1940 2,226,290

UNITED STATES PATENT OFFICE

2,226,290

THREAD CUTTING MECHANISM FOR WEFT REPLENISHING LOOMS

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Application July 8, 1940, Serial No. 344,309

6 Claims. (Cl. 139—263)

This invention relates to improvements in thread cutting mechanism for weft replenishing looms and it is the general object of the invention to provide a transfer mechanism controlled cutter to sever the thread at a point near the shuttle eye.

In weft replenishing mechanisms it is desirable to cut the thread of the outgoing bobbin near the shuttle eye so that the thread connected to the bobbin will be moved out of the shuttle eye during the transferring operation. That part of the thread extending from the cutting mechanism back to the selvage is then removed, as for instance, by the mechanism shown in my Patent No. 2,199,296. It is an important object of my invention to effect this cutting by means independent of any part carried by the shuttle including two cutters of the scissor type controlled as to position by the transferrer arm and capable of entering a slot formed in the shuttle to cut the thread.

It is a further object of my present invention to provide cutting jaws normally held separated by a relatively light spring and mount the cutter on a lever which is held in cutting position by a stronger spring during the thread cutting operation when the jaws move against the resistance of the lighter spring.

It is a further object of my invention to provide a control for the cutter carrying lever whereby the jaws close to cut the thread early in the lay beat, after which the lever swings forwardly to accommodate the continued motion of the lay, to be followed by an additional motion of the lever caused by the transferrer arm to prevent repeated engagement of the lever by the lay.

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 a convenient embodiment of my invention is set forth,

Fig. 1 is a side elevation of a weft replenishing loom having my invention applied thereto, parts being in section,

Fig. 2 is a detailed plan taken in the direction of arrow 2, Fig. 1 on an enlarged scale,

Fig. 3 is a plan view taken in the direction of arrow 3, Fig. 1, with the lay in front center position and the cutter in a position to sever the thread,

Fig. 4 is a detailed vertical section taken in the direction of arrow 4, Fig. 3, on an enlarged scale showing the thread cutter at the beginning of a cutting operation,

Fig. 5 is a view similar to Fig. 4 but with the thread completely cut, and

Fig. 6 is a detailed plan in the direction of arrow 6, Fig. 5, showing the lay carried mechanism which controls one of the cutter jaws.

Referring to the drawing, the loom frame 10 supports a magazine M having a frame 11 rockable about an axis 12 to present one or the other of two reserve bobbins B and B' in transfer position. The magazine includes a transferrer arm 13 mounted for rotation about a fixed horizontal stud 14 supported by the magazine. The transferrer arm has a bobbin engaging foot 15 and has depending arms 16 on which a latch holder 17 is pivoted at 18. The latch 19 is normally down in the position shown in Fig. 1 but is raised by mechanism not shown when a weft replenishing operation is to occur. The transferrer arm is normally held raised by a heavy torsion spring 20 surrounding the stud 14 to hold the foot 15 raised and the arms 16 in rearward position under normal non-replenishing operations of the loom.

The lay 21 is provided with a shuttle box 25 the front part of which is formed with a shuttle binder 26 behind which is located a shuttle S when the latter is on the magazine side of the loom. Projecting forwardly from the lay is a bunter 27 which engages the latch 19 when the latter is raised during forward motion of the lay to effect rocking of the transferrer arm 13 in a right hand direction as viewed in Fig. 1. The lay is reciprocated backwardly and forwardly in a horizontal direction by means of connectors one of which is shown at 28. The matter thus far described is of common construction and of itself forms no part of my present invention except as indicated hereinafter. When a transferring operation is to occur the lay, in moving forwardly or to the left as viewed in Fig. 1, will cause engagement of bunter 27 with the latch 19 to move the foot 15 downwardly against one or the other of the bobbins B or B' to effect movement of a fresh or reserve supply of weft into the depleted shuttle S.

The mounting for the cutter carrying lever L is shown particularly in Figs. 1 and 3 and includes a vertical stud 30 projecting through a lug 31 fixed to the stationary stud 14. A set screw 32 provides means for adjusting the stud 30 vertically and holding it in fixed position. Surrounding the lower enlarged part of stud 30

is a torsion spring 35 one end of which is fixed as at 36 while the other end is formed as at 37 to lie behind an arm 38 of a cutter carrying lever L. The lever L has a hub 40 arranged to turn on the bottom of stud 30 through which pin 41 extends to support lever L.

One of the arms 16 has a fin 42 which is normally urged by spring 20 against arm 38 to overpower the torsion spring 35 and hold its right or outer end 39 in extreme forward position. This part of the structure which I employ may be similar to that shown in prior patents to Payne Nos. 1,881,920 and 1,932,801.

In carrying my present invention into effect I provide a rod 50 which extends through a hub 51 formed on the lever arm 39 and is held in adjusted longitudinal position by a set screw 52. The rod extends rearwardly and supports a pivot pin 55 on which is pivotally mounted an upper cutter blade or jaw 57. A torsion spring 58 surrounds the stud 55 and has one end thereof projected forwardly to be fixed with respect to the rod 50 as at 59, see Fig. 4. The rear end of the spring 58 passes into the jaw 57 and tends to lift the latter against a stop 60 fixed with respect to the rod 50. The jaw 57 is formed integrally with a forwardly and downwardly extending operating arm 61. A stop or block 62 held adjustably along rod 50 by set screw 63 is in front of and arranged for engagement by arm 61.

As shown in Fig. 3 the shuttle is provided with a bobbin Y from which extends the weft thread W. The latter passes through the shuttle eye E, extends along the front wall of the shuttle and then continues to the left as viewed in Fig. 3 to have attachment with the selvage of cloth C. The shuttle is provided with a slot 70 located adjacent to the shuttle eye as shown in Fig. 3 and being proportioned to receive the jaws 57 and 65. The shuttle binder 26 is also provided with a slot 71 which is substantially aligned with the slot in the shuttle when the latter is properly boxed and cooperates with the slot in the shuttle to provide operating space for the cutter jaws.

In operation, the parts will normally be in the full line position shown in Fig. 1 when the lay is in rear position and approaching front center, that is, moving to the left. Assuming that exhaustion of weft has already been indicated and that a transfer operation is to occur, the latch 19 will be raised to the dotted line position of Fig. 1 for engagement with the bunter 27. Prior to engagement between these two parts the transferrer arm will be held raised by the relatively heavy spring 20, the fin 42 being in rear position to hold arm 39 forward and spring 58 holding jaw 57 up.

When the transferrer arm starts down, fin 42 will move forwardly so that spring 35 will be free to turn the arm 39 in a counter-clockwise direction as viewed in Fig. 3. The cutter jaws will therefore move rearwardly and will enter the slots 71 and 70, the weft thread W lying between them.

During rearward motion of the cutter jaws the operating finger F will be moving forwardly and will engage the arm 61 after the jaws have entered the slot 70 in their open position. Continued advance of finger F causes forward motion of arm 61 with resultant lowering of the upper jaw through the position shown in Fig. 4 to that shown in full lines in Fig. 5.

As the arm 61 swings forwardly it will engage the stop 62, after which continued forward motion of the lay will move the arm 39 in a clockwise direction as viewed in Fig. 3 and move the cutter jaws forwardly. This forward motion of stop 62 does not occur until the jaws have been completely closed and the thread severed, and this operation preferably occurs while the depleted bobbin is being pushed out of the shuttle. When the lay reaches its extreme forward position and the transferrer arm has moved a reserve bobbin in the shuttle S, the arm 61 will be held against the finger F by spring 35 due to the fact that the fin 42 at this time is in its extreme forward position and out of contact with the arm 38.

As the lay recedes fin 42 moves rearwardly and ultimately engages arm 38 and rocks the lever L in a clockwise direction as viewed in Fig. 3 a sufficient amount to move the cutter jaws out of slots 70 and 71 and also move arm 61 forwardly out of reach of the finger 68 on the next beat-up of the lay. As soon as the fin 42 arrests rearward motion of rod 50, spring 58 will start to raise the jaw 57 as fast as the receding finger F will permit.

While I have described the setting of the stop 62 as being in such position as to cause forward motion of the rod 50 by action of the finger 68, I do not wish necessarily to be held to this particular adjustment of the parts, inasmuch as it will be sufficient under certain conditions if the finger 68 engages the arm 61 late enough in the advance of the lay to close the jaws without necessarily requiring forward motion of the rod 50. In the customary operation of weft replenishing mechanisms, however, the outgoing bobbin leaves the shuttle before the reserve bobbin is completely inserted in the shuttle, and since it is desirable that the full motion of the outgoing bobbin be available for removing the thread from the shuttle eye, it is preferable to have the jaws cut the thread early in the advance of the lay. It is for this reason that the stop 62 is preferably set to cause forward motion of rod 50.

It will be understood from the description of the operation that the three springs 20, 35 and 58 bear a definite relation to each other, each being weaker than the preceding in the order named. Spring 20 is sufficiently strong to overpower spring 35 and cause fin 42 to rock lever L to normal position with the jaws in their foremost position, and spring 35 is sufficiently strong to withstand the forward thrust offered by the yielding resistance of arm 61 and spring 58 when the jaw 57 is being closed.

From the foregoing it will be seen that I have provided a simple form of weft thread cutter controlled by the transferrer mechanism of the loom and operating to cut the thread at a point close to the shuttle eye so that the outgoing bobbin can unthread the eye. It will also be seen that the jaws are normally open and are closed by the adjustable finger 68 preferably during the early part of the advance of the lay on a weft replenishing beat of the loom. It will further be seen that after a transfer the fin 42 rocks lever L sufficiently to move the arm 61 forwardly so it will not be struck by finger 68 on non-transferring beats of the lay. Again, the relation of the springs 20, 35 and 58 is such that each is weaker than the preceding in the order named so that the operations may ensue as described. The adjustment of the finger 68 made possible by the bolt 69 permits a limited variation in the time of cutting during the forward stroke of the

lay. It will further be apparent that where late cutting is permissible the stop 62 may be omitted.

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 a weft replenishing loom having a lay with a shuttle box having a slot therein to register with a slot in a shuttle contained in the shuttle box, the loom having a transferrer arm movable from normal position on replenishing beats of the loom to expel from the shuttle a bobbin the weft of which extends across said slots, a lever in front of the shuttle box, a fixed pivot for the lever around which the lever is movable toward and from the shuttle box, a relatively strong spring tending to move one end of the lever toward the shuttle box, stop means carried by the transferrer arm when the latter is in normal position to engage the lever and hold said one end in normal forward position away from said shuttle box, a cutter blade supported by said one end of the lever, a second cutter blade to cooperate with the first cutter blade and pivotally mounted with respect to said one end of the lever, a relatively weak spring acting on the second cutter blade to hold the same normally in open position with respect to the first cutter blade, the transferrer arm effective on a replenishing beat of the loom to move said stop in a direction to permit said strong spring to move said one end of the lever toward the shuttle box to insert said cutter blades into the aforesaid slots on opposite sides of the thread, and means carried by the lay to move the second cutter blade and cause the same to overcome the relatively weak spring and cooperate with the first named cutter blade to sever the weft, said relatively strong spring holding the lever in position to maintain the cutter blades in said slots during the thread severing operation.

2. In a weft replenishing loom having a lay with a shuttle box having a slot therein to register with a slot in a shuttle contained in the shuttle box, the loom having a transferrer arm movable from normal position on replenishing beats of the loom to expel from the shuttle a bobbin the weft of which extends across said slots, a lever located in front of the shuttle box, a fixed pivot for the lever around which the lever is movable toward and from the shuttle box, a relatively strong spring tending to move one end of the lever toward the shuttle box, stop means on the transferrer arm to engage the lever and hold said one end thereof normally spaced in front of the shuttle box when the transferrer arm is in normal position, a pair of relatively movable cutter blades mounted on said one end of the lever, relatively weak resilient means normally holding said cutter blades separated, the transferrer arm moving the stop on a replenishing beat of the loom in a direction to permit said relatively strong spring to move the jaws into the slots of the shuttle box and shuttle in position to sever the weft, and means carried by the lay to overpower said relatively weak resilient means and cause the cutter jaws to have a thread severing operation during forward movement of the lay, the relatively strong spring holding the cutter blades in said slots during the severing operation and yielding thereafter during subsequent forward motion of the lay to enable the latter to move said one end of the lever forwardly by a force derived from the lay.

3. In a weft replenishing loom having a lay with a shuttle box having a slot therein to register with a slot in a shuttle contained in the shuttle box, the loom having a transferrer arm movable from normal position on replenishing beats of the loom to expel from the shuttle a bobbin the weft of which extends across said slots, a lever located in front of the shuttle box, a fixed pivot for the lever around which the lever is movable toward and from the shuttle box, a relatively strong spring tending to move one end of the lever toward the shuttle box, stop means on the transferrer arm to engage the lever and hold said one end thereof normally spaced in front of the shuttle box when the transferrer arm is in normal position, a pair of relatively movable cutter blades mounted on said one end of the lever, relatively weak resilient means normally holding said cutter blades separated, the transferrer arm moving the stop in a direction to permit said relatively strong spring to move the jaws into the slots of the shuttle box and shuttle in position to sever the weft on a weft replenishing beat of the loom, and means carried by the lay to overpower said relatively weak resilient means and cause the cutter jaws to have a thread severing operation during forward movement of the lay, the relatively strong spring holding the cutter blades in said slots during the severing operation and yielding thereafter during subsequent forward motion of the lay to enable the latter to move said one end of the lever forwardly by a force derived from the lay, said stop being moved by the transferrer arm at the conclusion of a replenishing operation to cause additional motion of said lever and move said one end thereof to a forward position out of contacting relation with the lay on subsequent forward beats of the latter.

4. In a weft replenishing loom having a lay with a shuttle box having a slot therein to register with a slot in a shuttle contained in the shuttle box, the loom having a transferrer arm movable from normal position on replenishing beats of the loom to expel from the shuttle a bobbin the weft of which extends across said slots, a relatively strong spring to hold said transferrer arm in normal non-operating position, a lever in front of the shuttle box, a fixed pivot for the lever around which the lever is movable toward and from the shuttle box, a second spring of less strength than said strong spring tending to move one end of the lever toward the shuttle box, a stop carried by the transferrer arm to engage the lever and prevent said one end thereof from moving toward the shuttle box when the transferrer arm is in normal position, a pair of relatively movable cutter blades mounted on said one end of the lever, relatively weak resilient means of less strength than either of the aforesaid springs to hold said cutter blades normally open, the transferrer arm operating on a replenishing beat of the loom to move said stop in a direction to permit said second spring to move said one end of the lever rearwardly to place the cutter jaws in the slots of the shuttle box and shuttle on opposite sides of the thread, and means on the lay to cause relative closing movements of the cutter blades against the action of said relatively weak resilient means to sever the thread while said second spring holds said end of the lever in rearward position, continued forward motion of the lay effective to move said one end of the lever and the cutting blades forwardly against the ac-

tion of said second spring, and said relatively strong spring operating to return the transferrer arm to normal position and move said stop against the lever to overpower said second spring and move said one end of the lever and cutter blades to a forward position out of reach of the lay.

5. In a weft replenishing loom having a lay with a shuttle box having a slot therein to register with a slot in a shuttle contained in the shuttle box, the loom having a transferrer arm movable from normal position on replenishing beats of the loom to expel from the shuttle a bobbin the weft of which extends across said slots, a lever in front of the shuttle box, a fixed pivot for the lever around which the lever is movable toward and from the shuttle box, resilient means tending to move one end of the lever toward the shuttle box, stop means on the transferrer arm to engage the lever when said transferrer arm is in normal position to prevent said resilient means from moving the aforesaid one end of the lever toward the shuttle box, a rod adjustably held in said one end of the lever for motion relatively thereto toward and from the shuttle box, a pair of relatively movable cutter blades at the rear of said rod, relatively weak resilient means normally holding said blades open, the transferrer arm moving said stop during a replenishing operation of the loom in a direction to permit the first named resilient means to move said end of the lever, the rod and cutter blades rearwardly to place said cutter blades in the slots of the shuttle box and shuttle on opposite sides of the thread, means on the lay to effect closing of said blades to sever the thread and overpower the second-named relatively weak resilient means while the first named resilient means holds said rod rearwardly, and a stop on said rod to be acted upon by a forwardly directed force derived from the lay after the thread severing operation to move said lever end and rod forwardly during continued advance of the lay subsequent to the thread severing operation.

6. In a weft replenishing loom having a lay with a shuttle box having a slot therein to register with a slot in a shuttle contained in the shuttle box, the loom having a transferrer arm movable from normal position on replenishing beats of the loom to expel from the shuttle a bobbin the weft of which extends across said slots, a lever in front of the shuttle box, a fixed pivot for the lever around which the lever is movable toward and from the shuttle box, relatively strong resilient means tending to move one end of the lever toward the shuttle box, stop means on the transferrer arm to engage the lever when said transferrer arm is in normal position to prevent said resilient means from moving the aforesaid one end of the lever toward the shuttle box, a rod adjustably held in said one end of the lever for motion relatively thereto toward and from the shuttle box, a cutter blade fixed with respect to the rod and projecting rearwardly therefrom, a second cutter blade pivotally mounted on the rod and projecting rearwardly therefrom, an operating finger on said second cutter blade, relatively weak resilient means normally holding said cutter blades separated with said finger in rear position relative to the lever, the transferrer arm operative on a replenishing beat of the loom to move said stop in a direction to permit the first named resilient means to project said end of the lever and rod rearwardly to place the cutter blades in the slots of the shuttle box and shuttle with one blade above and the other blade below the weft thread, means carried by the lay thereafter effective to engage the finger and cause a relative thread severing motion of the blades to cut the thread and overpower the second named relatively weak resilient means while the first named resilient means holds said end of the lever and rod in relative rearward position, and stop means carried by the rod to be engaged by said finger to move the rod and said end of the lever forwardly by a force derived from the lay subsequent to the thread cutting operation.

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