

June 16, 1953

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2,642,095

THREAD CUTTER

Filed Aug. 30, 1951

2 Sheets-Sheet 1

FIG. 1

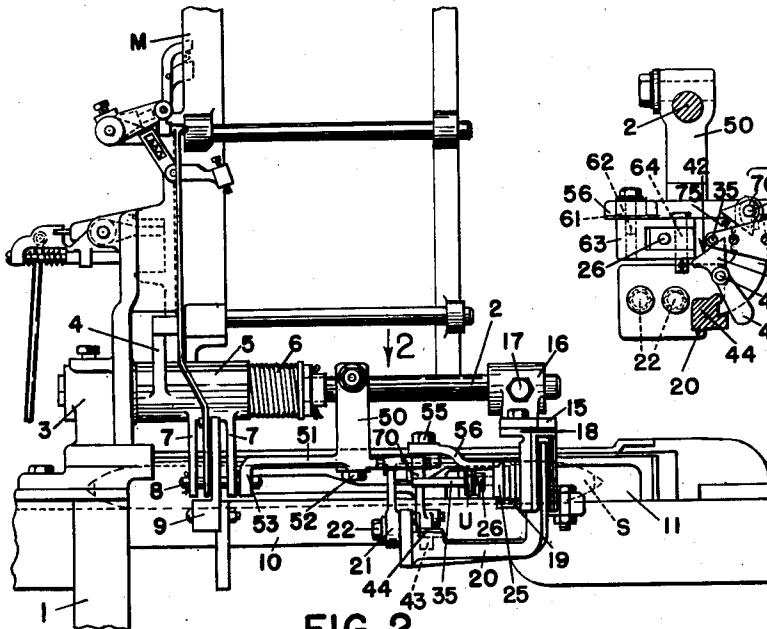


FIG. 3

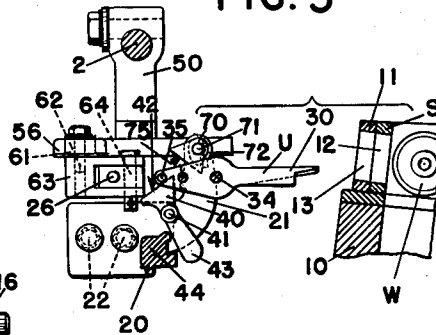


FIG. 2

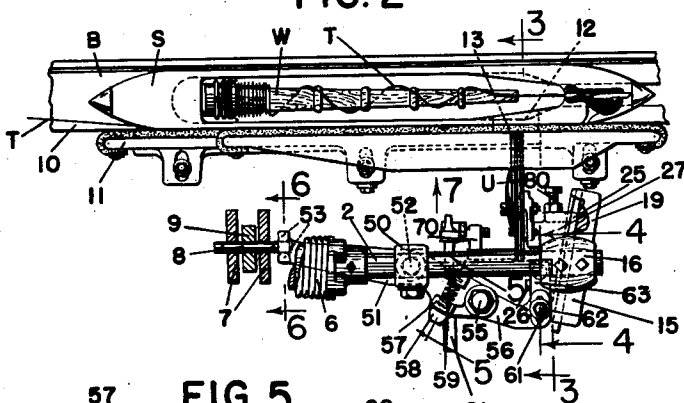


FIG. 4

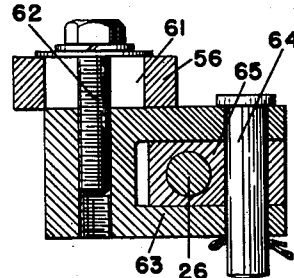


FIG. 13

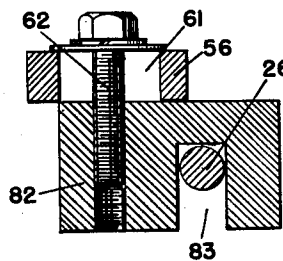


FIG. 6

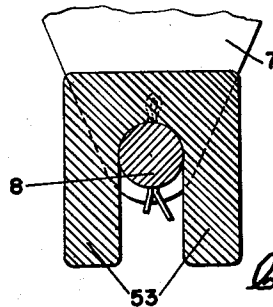
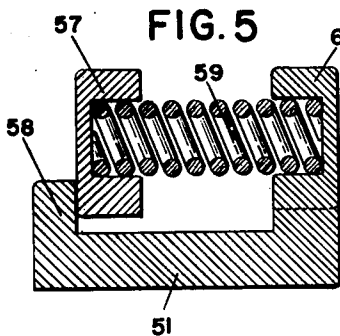


FIG. 5



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FIG. 7

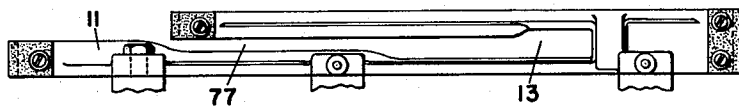


FIG. 8.

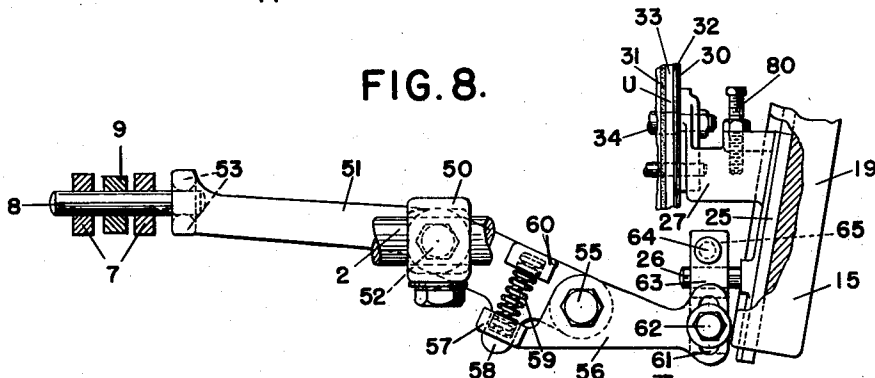


FIG. 10.

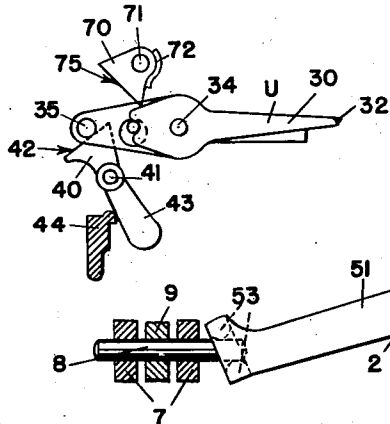


FIG. 9.

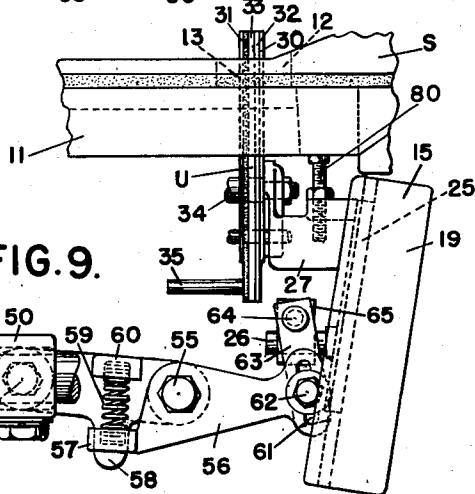


FIG. 11.

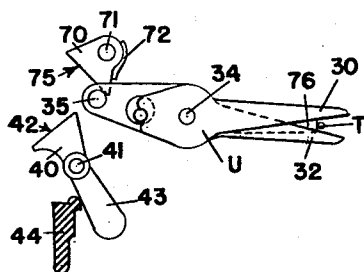
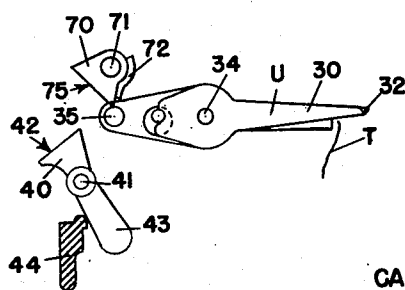


FIG. 12.



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THREAD CUTTER

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8 Claims. (Cl. 139—267)

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This invention relates to improvements in thread cutter and clamp mechanism for weft replenishing looms and it is the general object of the invention to provide such a mechanism operated in such manner that it will cut the outgoing thread on a weft replenishing beat of the loom after the thread has been drawn taut by the descending outgoing bobbin.

A well-known type of thread cutter has a thread cutting and clamping unit mounted on a slide to be moved rearwardly on weft replenishing beats of the loom to enter a slot in the front wall of the shuttle. Mechanism is provided to open the unit during its rearward motion and other mechanism is employed to close the unit to cut and clamp the thread on its return motion to normal forward position. In such a mechanism the actual cutting operation takes place when the outgoing thread may be slack and below the cutter due to rebounding of the shuttle. When the outgoing bobbin has descended far enough to draw the thread taut across the shuttle slot where it would be correctly placed for cutting the time for cutting has passed because of the early operation of the cutter.

It is an important object of the present invention to provide a thread cutting and clamping mechanism of the general type already mentioned, but wherein the closing or cutting operation is delayed until the lay is about on front center and the depleted bobbin has had opportunity to descend far enough to draw the thread taut. This time of cutting is so late in the loom cycle that there is too little remaining forward motion of the lay, operating alone and as the sole means for actuating the cutter, to cut the thread, and separate or additional means are provided to supplement the forward motion of the lay, thereby providing ample motion for operation of the cutter.

It is a further object of the invention to provide two separate means operating successively during rearward motion of the thread cutting and clamping unit first to open the latter and thereafter close it for the cutting operation. These means may be in the form of pivoted trips which are inoperative during forward motion of the unit to open it. These two trips are preferably located one behind the other so that they may successively engage a stud or the like extending laterally from the movable cutting and clamping parts of the unit, the second trip closing the unit during the last part of forward motion of the lay before the outgoing bobbin has descended far enough to break the thread.

In order that the invention may be clearly

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understood reference is made to the accompanying drawings which illustrate by way of example two embodiments of the invention and in which:

Fig. 1 is a front elevation of part of a weft replenishing loom having the invention applied thereto,

Fig. 2 is a plan view looking in the direction of arrow 2, Fig. 1, showing the thread cutting and clamping unit and associated mechanism in normal non-cutting position,

Fig. 3 is a vertical section on line 3—3, Fig. 2,

Fig. 4 is an enlarged vertical section on line 4—4, Fig. 2, showing the preferred form of operative connection between the positioning lever and the slide on which the cutter and clamping unit is mounted,

Figs. 5 and 6 are large detail vertical sections on lines 5—5 and 6—6, respectively, Fig. 2,

Fig. 7 is a detail front elevation looking in the direction of arrow 7, Fig. 2, showing the front of the shuttle box,

Fig. 8 is an enlarged diagrammatic view showing part of the structure shown in Fig. 2 in normal non-operating position,

Fig. 9 is a view similar to Fig. 8, but showing the cutter and clamping unit in its rearmost position,

Fig. 10 is a diagrammatic view showing the cutter and clamping unit and its associated operating means in the position which the unit occupies at the beginning of a rearward movement thereof, the unit being closed,

Fig. 11 is a view similar to Fig. 10 but shows the unit in the position which it occupies after being opened during the first part of its rearward motion,

Fig. 12 is a view similar to Fig. 11, but shows the unit in the position which it occupies during the latter part of its rearward motion, after it has been closed to cut and clamp the thread, and

Fig. 13 is a view similar to Fig. 4 but showing a modified form of the invention wherein the operative connection between the operating lever and the unit carrying slide is similar to the connection between the lever and the transferrer mechanism.

Referring particularly to Figs. 1 and 2, the loom frame 1 supports a reserve bobbin magazine M which may be of any conventional type including in its construction a horizontally extending stud 2 held in fixed position in a bearing 3 forming part of the magazine. A transferrer arm 4 has a hub 5 mounted for rocking movement on the stud 2 and the usual torsion spring 6 normally holds the transferrer arm in its inoperative raised

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position. Two depending fingers 7 on the hub 5 support a stud 8 the axis of which is parallel to that of stud 2 and on which the usual transferrer latch 9 is pivoted. On a weft replenishing beat of the loom the latch will be raised and engaged by the advancing lay 10 to rock the transferrer arm so that a reserve bobbin in the magazine can be inserted into the shuttle S in a shuttle box B on the lay.

At the time of a replenishing operation the shuttle will carry a depleted weft carrier W from which a weft thread T will extend along the front wall of the shuttle between the latter and a box front 11 secured to the lay in any approved manner. The shuttle may be provided with a slot 12 in register with a slot 13 in the box front, and the thread T extends across these slots and to the left as viewed in Fig. 2 toward the selvage of the cloth being woven. The fresh incoming bobbin will be fully inserted into the shuttle when the lay reaches front center and the depleted bobbin will have been pushed downwardly out of the shuttle.

The outer or right hand end of stud 2 as viewed in Fig. 1 has secured thereto a fixed structure designated generally at 15. This structure includes a hub member 16 secured to the stud 2 by a set screw 17, a depending member 18 secured to the hub member, a back and forth extending guide 19 fastened to the member 18, a horizontally extending member 20, and a trip carrier 21 secured at 22 in back and forth adjusted position on the left end of the member 20. These several parts are all bolted together to form the rigid structure 15 which can be adjusted lengthwise of and angularly around the stud 2.

A slide 25 mounted for back and forth motion on guide 19 has secured thereto a stud 26 extending laterally therefrom to the left, see Fig. 8, and has integral therewith a carrying arm 27 also extending to the left. The arm 27 is provided with a thread cutting and clamping unit designated generally at U having two cutter blades and two clamping blades. One of the thread cutting blades 30 is fixed with respect to the arm 27 and is at the right of the unit, Fig. 8, while one of the thread clamping blades 31, also fixed with respect to arm 27, is at the left of the unit. Between these two blades 30 and 31 are a second cutting blade 32 and a second clamp blade 33 which move in unison pivotally about a stud 34 fixed with respect to arm 27. The inner blades 32 and 33 constitute the moving elements of the unit U and are actuated by means of a stud 35 secured to the forward parts of blades 32 and 33. Stud 35 is moved vertically to actuate the blades 32 and 33 by mechanism to be set forth hereinafter.

A trip member 40 rocks about a pivot 41 fixed with respect to the member 20 of the stationary structure 15 and has an upwardly and rearwardly inclined cam face 42 and has a depending counterweighted arm 43 normally held by gravity in stationary position against a stop 44 which may conveniently be cast integral with the member 20.

The matter thus far described may be of usual construction and operates in the ordinary manner. The cutter and clamp unit and its slide 25 will normally be in forward position with the unit closed as suggested for instance in Fig. 10. A weft replenishing operation of the loom occurs during forward movement of the

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lay, and the unit U is for the purpose of cutting the thread T near the eye of the shuttle and clamping that part of the thread leading toward the selvage so that it cannot be whipped into the warp shed by the shuttle to produce a fault in the fabric.

In carrying the present invention into effect stud 2 has secured thereto a depending carrier 50 on the lower end of which is mounted a lever designated generally at 51. This lever swings horizontally about a vertical stud 52 on the lower end of the carrier 50 and has the left end thereof forked and provided with spaced depending fingers 53 which straddle the previously described stud 8. The connection between the latter stud and the lever is sufficiently loose to prevent binding of the parts when the stud 8 is moved forwardly by the transferrer arm to effect rocking of lever 51 in a clockwise direction as viewed for instance in Fig. 8.

The part of lever 51 to the right of stud 52, see Fig. 8, carries a vertical stud 55 on which is pivoted a small arm or finger 56 having a socket part 57 thereof normally held against a stop 58 on lever 51 by a compression spring 59 one end of which engages part 57 and the other end of which is held by a socket lug 60. The finger 56, as shown in Fig. 8, has therein a back and forth extending slot 61 through which extends a screw 62 tapped into a rearwardly extending block carrier 63. This carrier is provided with a vertical pin 64 on which is pivoted a block 65 through which extends the previously described stud 26. The block is capable of turning on the pin 64 and has a sliding engagement with the stud 26.

A second trip means 70 is pivoted on a stud 71 fixed with respect to the trip carrier 21. This trip 70 is normally stationary and held by gravity against a stop 72 fixed on member 21 which prevents counter-clockwise rocking of the trip 70 as viewed in Fig. 10 but permits the trip to rock in a clockwise direction.

Under normal conditions the lever 51 will be in the position shown diagrammatically in Fig. 8 with the forked left end thereof in rear position due to the fact that the transferrer arm is raised. The thread cutting and clamping unit U and its slide 25 will be in forward position and the finger or small arm 56 will be held against the stop 58 so that in effect it becomes a part of lever 51 and will be in forward position.

When a weft replenishing operation occurs the transferrer arm 4 will be rocked in a direction to move stud 8 forwardly as the lay advances, thus rocking lever 51 in a counter-clockwise direction from the position shown in Fig. 8 toward the position shown in Fig. 9. During rocking of lever 51 the slide 25 will have a movement rearwardly in guide 19 and during the first part of this movement trip 40 will engage the lateral stud 35 of the cutter and clamp unit as indicated in Fig. 10, thereby lowering the rear ends of the cutter and clamp elements 32 and 33 to effect opening of the unit. As the lay continues its forward motion unit U will continue to move rearwardly, and when the lay is only a very short distance from front center the stud 35 will engage the downwardly and rearwardly inclined cam face 75 of the normally stationary trip 70 and be pushed down to effect closure of the unit U from the position shown in Fig. 11 to that shown in Fig. 12. The unit U will be in slot 13 at this

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time but preferably does not enter slot 13 in the shuttle until the lay is far enough forward to have caused enough down motion of the outgoing bobbin to tighten the thread, should it have been slack. It will thus be seen that as the unit is moved rearwardly incident to a bobbin changing operation of the transferrer arm the unit is first opened by the trip 40 to permit the thread T to enter the bight 76 just before the lay reaches front center, and then as the unit continues to move a short distance rearwardly the trip 70 closes the unit to cut and clamp the thread. The parts will then be in the position shown in Fig. 9. After the cutting operation starts the lay has very little forward motion, insufficient to operate the cutter if reliance were placed solely on motion of the lay, but the inclined surface 75 supplements the lay motion and with it causes sufficient movement of the cutting blade.

As the lay moves rearwardly after replenishment the transferrer arm will rise and stud 8 will move rearwardly, thereby rocking lever 51 in a clockwise direction as viewed in Fig. 9 and returning the lever to its normal position shown in Fig. 8 with accompanying forward motion of the slide 25 and the unit U. During this forward motion of the unit the stud 35 may engage trip 70 and in all likelihood will engage trip 40, but these trips are so mounted that they can both rock without effecting opening of the unit and the latter remains closed during all of its forward motion. As the unit U moves forwardly the clamped part of the thread will move forwardly out of a slot 77 in the box front 11, see Fig. 7.

The slide 25 has secured thereto a rearwardly extending abutment screw 80 which can engage an advancing part of the lay if need be to prevent the unit from penetrating too deeply into the shuttle. Ordinarily, this screw will not engage the lay, or at most will have only slight contact with it, and is present chiefly as a safety measure.

In the modified form of the invention shown in Fig. 13 the block carrier 63 is replaced by the member 82 which is held fixed to finger 56 by screw 62 and has a downwardly opening slot 83 to receive the stud 26. It will be understood that rocking of lever 51 will in the preferred form of the invention cause the pin 64 to move along an arcuate path and it is for this reason that the block 65 is provided in the preferred form to slide along stud 26. In the modified form, however, the relatively loose fit of stud 26 in slot 83 permits the member 82 to move angularly around stud 52 without requiring it to be pivoted on finger 56.

From the foregoing it will be seen that the invention sets forth thread cutting and clamping mechanism normally in forward position and closed but acted on during rearward movement on a weft replenishing beat of the loom first to open and thereafter close to cut the outgoing thread. The trip means 40 and 70 are normally stationary and successively effect these operations of the cutting and clamping unit, but as the latter moves forwardly the trip means both rock on their pivots and enable the unit to remain closed to hold the thread which it clamped incident to the cutting operation. Also, the cutting operation occurs very late in the forward motion of the lay, so late in fact that if sole reliance were placed on motion of the lay to operate the unit there would not be enough lay movement for this purpose, but the incline 75 of trip 70 acts in conjunction with the very small remaining

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forward motion of the lay after a cutting operation starts to give the movable cutting blade ample motion to cut the thread. Furthermore, the lever 51 swings about a vertical axis and constitutes a simple connection between the transferrer arm and the slide 25.

Having now particularly described and ascertained the nature of the invention and in what manner the same is to be performed, what is claimed is:

1. In thread cutting and clamping mechanism for a weft replenishing loom in which a thread extending along a shuttle is moved forwardly on a lay on a weft replenishing operation of the loom, an actuator member having a reciprocating motion incident to a weft replenishing operation of the loom, a normally closed thread cutting and clamping unit mounted for back and forth motion, means operated by the actuator member causing said unit to have a rearward movement followed by a forward movement on a weft replenishing beat of the loom, opening means effective during the first part of said rearward movement of the unit to open the latter, and closing means stationary during the latter part of said rearward movement of the unit cooperating with the latter and effective due solely to said rearward movement to close the unit to cut and clamp said thread between the ends of the shuttle, said opening means being ineffective to open said unit on the forward movement of the latter.

2. In thread cutting and clamping mechanism for a weft replenishing loom in which a thread extending along a shuttle is moved forwardly on a lay on a weft replenishing operation of the loom, an actuator member having a reciprocating motion incident to a weft replenishing operation of the loom, a normally closed thread cutting and clamping unit mounted for back and forth motion, means operated by the actuator member causing said unit to have a rearward movement followed by a forward movement on a weft replenishing beat of the loom, and two separate pivoted means stationary during said rearward movement of said unit successively acting on the latter during and due solely to said rearward movement thereof, one of said two means effecting opening of the unit and the other of said two means thereafter effecting closing of the unit to cut and clamp said thread between the ends of the shuttle, both of said means being capable of angular motion if engaged by a part of said unit during forward movement thereof to be ineffective to open said unit during said forward movement thereof.

3. In thread cutting and clamping mechanism for a weft replenishing loom in which a thread extending along a shuttle is moved forwardly on a lay on a weft replenishing operation of the loom, a bobbin transferrer arm operated by the lay on a weft replenishing operation of the loom, a thread cutting and clamping unit mounted for back and forth motion, means constituting a vertical pivot, a lever on said pivot operatively connected to said transferrer arm and to said unit effective to give the latter a rearward movement on a weft replenishing operation of the loom as the lay moves forwardly, and two separate means, one in front of the other, both acting on said unit during and due solely to said rearward movement thereof, said one means effective to open said unit and said other means thereafter effective to close said unit to cut and clamp said thread between the ends of the shuttle.

4. The thread cutting and clamping mecha-

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nism set forth in claim 3 wherein said other means includes a pivoted trip and a stop therefor effective to prevent pivoting of the trip on the rearward movement of said unit but enabling said trip to pivot if engaged by said unit when the latter moves forwardly.

5. In a thread cutting and clamping mechanism for a weft replenishing loom in which a thread extending along a shuttle is moved forwardly on a lay on a weft replenishing operation of the loom, a bobbin transfer arm which has a reciprocating motion on a weft replenishing beat of the loom, a thread cutting and clamping unit normally closed, a back and forth extending fixed guide, a slide movable in the guide and supporting said unit, a lever rockable about a fixed vertical axis and having one end thereof operatively connected to the transfer arm, a block pivoted to the lever for swinging in a horizontal plane, operative connections between the block and slide effective to give the slide and unit a rearward movement derived from the transfer arm when the latter moves in one direction as the lay advances on a weft replenishing operation of the loom, and means successively opening and then closing said unit during said rearward movement of the unit, said lever and block being effective on the opposite motion of the transfer arm to give said slide and unit a forward motion throughout which said unit remains closed.

6. The thread cutting and clamping mechanism set forth in claim 5 wherein the transfer arm is provided with a stud extending parallel to the axis of the transfer arm and the end of the lever adjacent to said arm is forked and straddles said stud.

7. In thread cutting and clamping mechanism for a weft replenishing loom in which a thread extending along the shuttle is moved forwardly on a lay on a weft replenishing operation of the loom, a bobbin transfer arm which is given a

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positive operating movement by the lay on a weft replenishing operation of the loom, a thread cutting and clamping unit mounted for back and forth motion, means constituting a vertical pivot, a lever on said pivot, operative connections between one end of said lever and said transfer arm acting in such manner as to move the other end of the lever rearwardly positively by said transfer arm on a weft replenishing operation of the loom, said other end of said lever being made in two parts to one of which said cutting and clamping unit is operatively connected, two separate means, one in front of the other, both acting on said unit during and due solely to rearward movement of the unit, said one means effective to open said unit and said other means thereafter effective to close said unit to cut and clamp said thread between the ends of the shuttle, resilient means operatively connected to said parts of the other end of said lever holding said parts in normal position, and a stop associated with said unit effective if engaged by the lay as the latter moves forwardly to overpower said resilient means and cause relative movement of said parts of the other end of the lever to enable said unit to move forwardly.

8. The thread cutting and clamping mechanism set forth in claim 7 wherein the operative connections between said transfer arm and said one arm of the lever includes a stud on which a transfer latch is pivoted.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,291,059	Marshall et al.	Jan. 14, 1919
1,765,324	Davis	June 17, 1930
1,970,743	Gordon	Aug. 21, 1934
2,515,045	Kielczewski et al.	July 11, 1950