Jan. 17, 1950 H. A. WHITIN 2,494,976

THREAD CUTTER FOR WEFT REPLENISHING LOOMS

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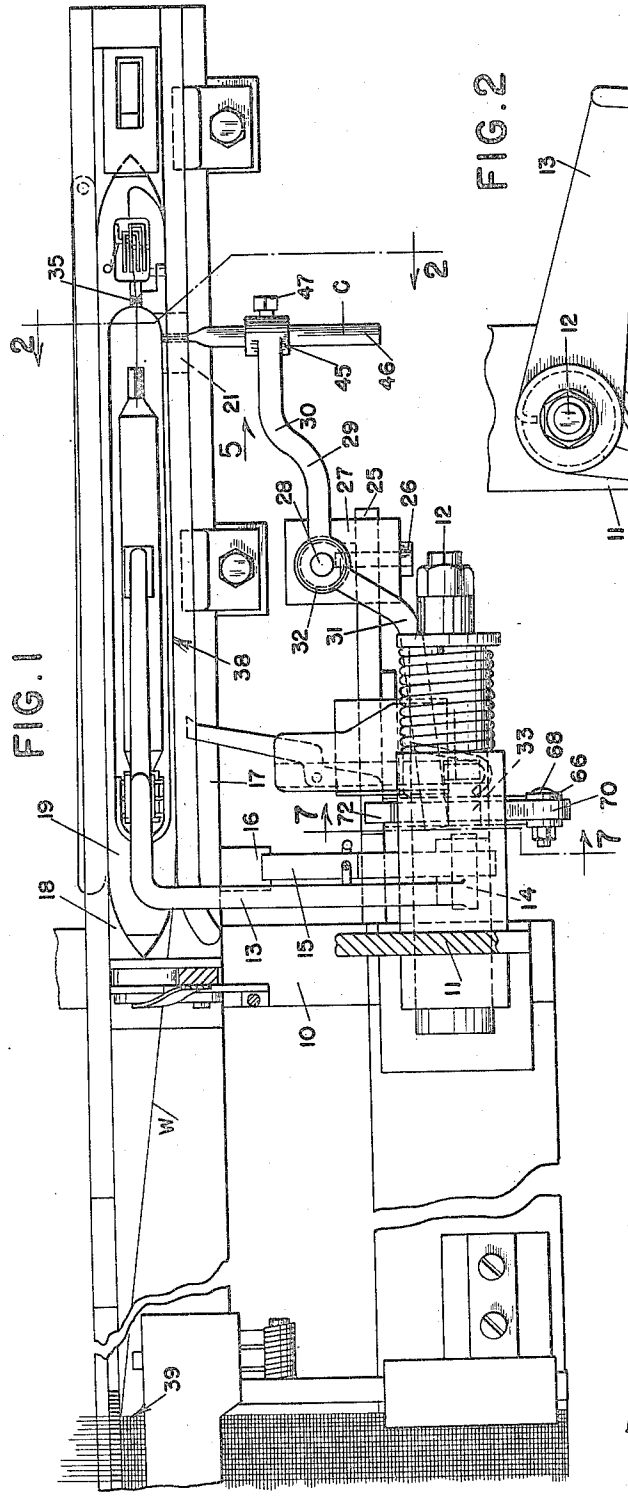

FIG. 1

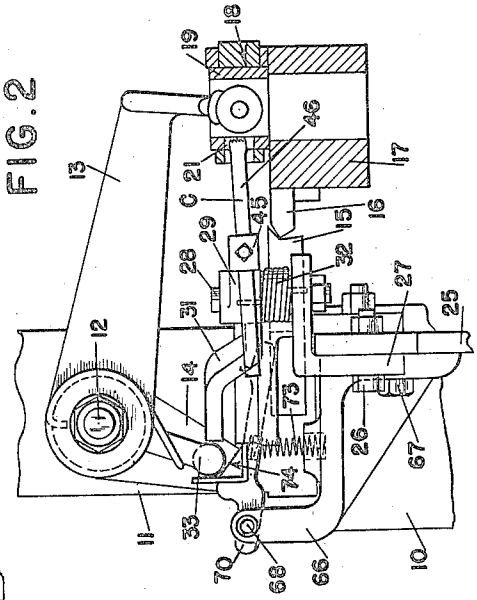

FIG. 2

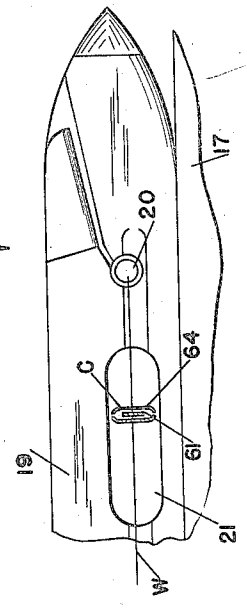

FIG. 3

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FIG. 4

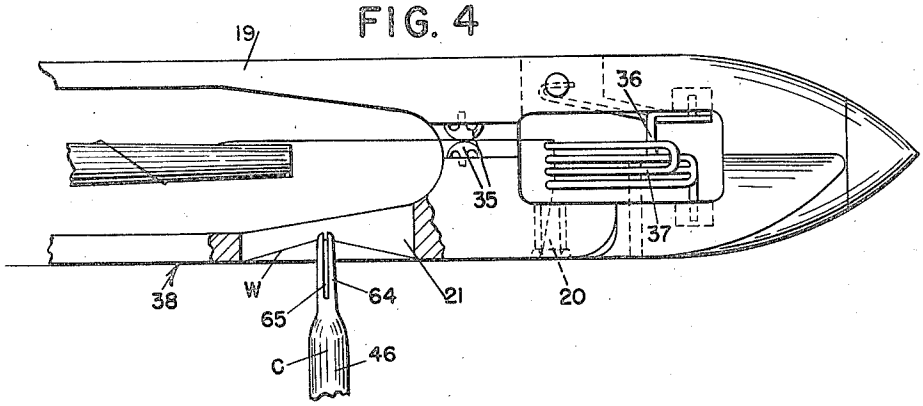


FIG. 5

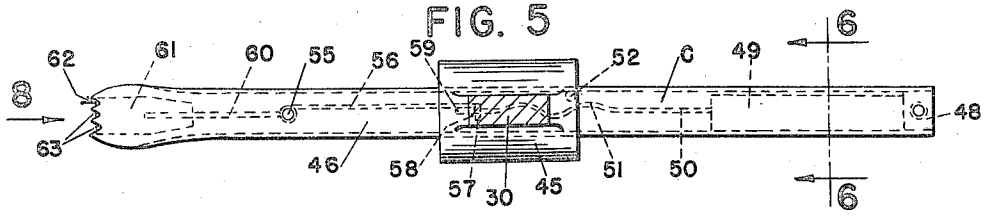


FIG. 8

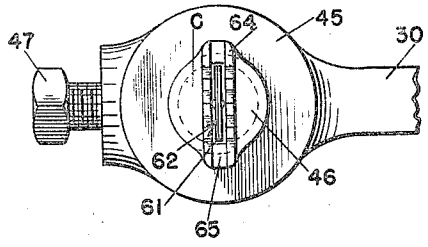


FIG. 6

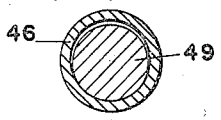
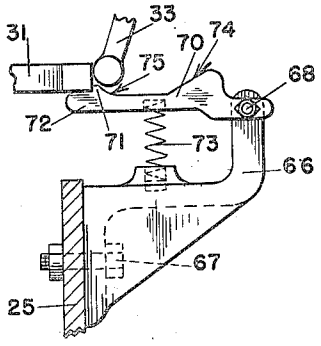


FIG. 7



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THREAD CUTTER FOR WEFT REPLENISHING LOOMS

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17 Claims. (Cl. 139—267)

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This invention relates to thread cutters for weft replenishing looms and it is the general object of the present invention to provide a simple form of weight actuated cutter.

During a weft replenishing operation the depleted bobbin when pushed out of the shuttle to make room for the full incoming bobbin leaves a thread which extends through the shuttle eye and back along the shuttle box to the adjacent selvage. This thread must be removed, otherwise it will be drawn into the shed and produce a thick place or other blemish in the fabric being woven. It has been proposed heretofore to cut this thread at various points along its length and then remove it either by mechanical or pneumatic means. The cutting mechanism, however, ordinarily requires engagement of some part of it with the lay to cause cutting of the thread.

It is an important object of the present invention to provide a thread cutter having a weight actuated cutter blade which operates due merely to movement of the cutter to cutting position, thereby eliminating the previously used lay actuated part.

It is a further object of the invention to provide a cutter unit including a movable weight operatively connected to a cutter blade and acting due to momentum to operate the blade. The cutting mechanism may all be located within a tube in protected position, but the inclosing tube is not essential in all forms of the invention.

The invention is not necessarily limited to the cutting of the thread of the depleted outgoing bobbin, but when used in that connection it can be controlled by the bobbin transferrer mechanism. In the past cutters controlled in this manner have had their rate of movement determined by the rate at which the lay operates the transferrer arm. In order that the present cutter mechanism may be given a motion faster than that which can conveniently be derived from the lay it is a further object of the invention to provide a detent or lock which will hold the cutter mechanism in its normal forward inoperative position for a period after the transferrer arm has started to move, and then release the detent so that by spring action or the like the cutter mechanism can have a quick movement which will impart sufficient momentum to the weighted mass for proper operation of the cutter blade. A part of the transfer mechanism may if desired serve as a stop to cause abrupt arresting of the motion of the cutter mechanism.

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

In the accompanying drawings, wherein a convenient embodiment of the invention is set forth,

Fig. 1 is a plan view of part of the weft replenishing mechanism of a loom having the invention applied thereto, parts of the structure being shown in cross section,

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Fig. 2 is a vertical section on line 2—2 of Fig. 1,

Fig. 3 is a front elevation of one end of the shuttle adapted for use with the invention,

Fig. 4 is a plan view looking in the direction of arrow 4, Fig. 3,

Fig. 5 is an enlarged elevation of the tube and cutter mechanism together with part of its mounting looking in the direction of arrow 5, Fig. 1,

Fig. 6 is an enlarged vertical section on line 6—6 of Fig. 5,

Fig. 7 is a vertical section on line 7—7, Fig. 1, showing the locking detent for the cutting mechanism, and

Fig. 8 is an enlarged rear elevation of the cutter unit.

Referring to Figs. 1 and 2, the loom frame 10 supports a foot 11 on which is mounted the stud 12 for a bobbin transferrer arm 13. The latter is provided with a depending foot 14 to which is connected a latch 15 for engagement with a bunter 16 on the lay 17 during a weft replenishing operation of the loom. The lay is provided with a shuttle box 18 containing a shuttle 19 which as shown more particularly in Fig. 3 is provided with a thread delivery eye 20 and an opening or recess 21 for a purpose to be described hereinafter.

Supported by the loom frame 10 or in any other manner is a stand 25 to which is bolted as at 26 a support 27 to which is secured a vertical stud 28. The latter has pivotally mounted thereon a lever 29 having a carrier or carrier arm 30 extending to the right and a control arm 31 extending to the left. A spring 32 around stud 28 tends normally to move the left control arm 31 forwardly and the right carrier arm 30 rearwardly. A control finger or member 33 on the transferrer arm is in rear position when the arm 13 is in its normal raised position. When the transferrer arm descends on an operating stroke to its low position shown in Fig. 2 finger 33 moves forwardly, and as arm 13 rises after transfer is completed the finger 33 moves forwardly. The finger or control member 33 is thus seen to have a back and forth movement through a given range of motion on each replenishing beat of the loom.

As shown in Fig. 4 the shuttle is provided with a depleted bobbin B from which extends a weft thread W which is to be cut on a weft replenishing operation. Thread W passes through the friction pads 35 and then extends forwardly across tension take-up wires 36 and 37 to the delivery eye 20. Wires 36 and 37 may be similar to the wires shown in Hutchins Patent No. 1,826,315. The pads normally resist movement of the weft thread in a direction from the bobbin to the delivery eye, and the wires 36 and 37 act as set

forth in the aforesaid Hutchins patent to take up any slack which may develop in the thread caused for instance by rebounding of the shuttle incident to its boxing. The thread extends from the delivery eye along the front wall 38 of the shuttle to the adjacent selvage 39 as shown in Fig. 1.

Except as noted hereinafter the matter thus far described may be made as set forth in prior patent to Payne No. 1,881,920 as well as the Hutchins patent previously mentioned.

In carrying the present invention into effect the carrier arm 30 is provided with a hub 45 the bore of which is preferably though not necessarily inclined slightly in a downwardly and forwardly direction. Supported by the hub is a cutter unit designated generally at C. This unit includes a tube 46, which may be of circular cross section, held in hub 45 in adjusted back and forth position by a set screw 47. The forward end of the tube is closed by a plug 48 and a weight or weighted mass 49 is mounted for limited free back and forth motion within the tube, the latter serving as a guide for the weight, see Fig. 6. Extending rearwardly from the weighted mass 49 is a wire or operating element 50 of sinusoidal or serpentine form as indicated at 51. A stop 52 on the tube limits rearward movement of the weight 49 relatively to the tube.

A horizontal pivot pin 55 extends through the tube and has mounted thereon a lightweight lever 56 which may if desired be made of wire. The forward end 57 of the wire is provided with an eye 58 through which the rear end 59 of the operating wire 50 extends for all positions of the weighted mass 49 within the tube. Secured to the rear end of the back arm 60 of lever 56 is a vertical thin metallic cutting blade 61 having a cutting edge 62. The cutting edge extends vertically behind the forward extremities of thread receiving notches 63 cut in the rear end of tube 46, but forward of the rear extremities of the notches, see Fig. 5. As shown more particularly in Fig. 8 the tube 46 has its rear end flattened as at 64 and provided with a vertical slot 65 in which the blade 61 is movable vertically.

As shown more particularly in Fig. 7 the bracket 25 has a support 66 secured thereto as at 67 and is provided with a horizontal stud 68 on which is pivotally mounted a detent or lock member designated generally at 70. This lock has a rear upwardly extending hook or tooth 71 and a backward extension 72 serving as a stop to engage the under side of control arm 31 of lever 29. A compression spring 73 interposed operatively between the support 66 and lock 70 tends normally to lift the latter but permits it to be pressed downwardly. An upwardly and forwardly extending cam 74 is formed on top of the lock 70 for engagement with the control member 33 of the transferrer arm.

Under normal conditions the detent will be in the raised position shown in Fig. 7 and the transferrer arm, being raised, will locate the control finger 33 in the rearmost part of its range of motion, where it may be close to or in actual engagement with the control arm 31 of lever 29. The detent or lock tooth 71, being raised by spring 73, acts to prevent forward movement of control arm 31 and therefore prevents rearward movement of carrier arm 30. When a weft replenishing operation occurs and the transferrer arm descends in usual manner the finger 33 will be advanced or move to the right as viewed in Fig. 7 by a force derived from the lay, but the control arm 31 will still be held by the detent tooth 71. Near the end of the forward range of

movement of the finger 33 the latter will slide along the cam 74 to depress the lock 70 against the action of spring 73, thereby lowering the holding tooth 71 to a position below the lever arm 31. The lever 29 is thereupon released and swung in a counter-clockwise direction as viewed in Fig. 1 under the action of spring 32.

As lever 29 swings as above described the carrier arm 30 and cutter unit C will move rearwardly and the notched rear end of tube 46 will enter the recess 21 in the shuttle wall and the thread W will enter one or another of the thread notches 63. Swinging of lever 29 is stopped abruptly by engagement of its control arm 31 with control member 33, whereupon the weighted mass 49, due to its momentum, will slide rearwardly within the tube 46, causing the actuator or operating wire element 50 to slide through the eye 58 and oscillate the lever 56 and thereby vibrate the cutter blade 61 vertically in slot 64. The accompanying movement of the cutting edge 62 while the thread is held in one or the other of the notches 63 effects cutting of the thread. Thereafter that part of the thread extending to the right of the cutter as viewed in Fig. 1 will be removed from the shuttle eye by the descending depleted bobbin, and the part of the thread extending toward the selvage can be brought under control by any one of several mechanisms which need not be described herein but are of well-known construction and serve to prevent the thread from being drawn into the warp shed.

Transfer will be completed when the lay is on front center position, and when the lay starts to move rearwardly control finger 33 will also move rearwardly and push control arm 31 backwardly. During this motion finger 33 moves away from cam 74 so that spring 73 is free to raise the detent 70, but as finger 33 nears its rearmost position it forces control arm 31 against the inclined surface 75 of the tooth 71, depressing the lock 70 until the lever arm 31 is behind the detent tooth, whereupon the latter rises to its reset locking position shown in Fig. 7.

The rearward motion of lever arm 31 causes forward motion of carrier arm 30, the tube 46, and the weighted mass 49 which is likely to be in its rear position. When the finger 33 reaches its rearmost position, motion of the tube in the forward direction will be prevented, but the weighted mass being free again by its momentum to move within the tube, will move forwardly to the normal position shown in Fig. 5. The parts are thus restored to their normal position and are in readiness for another cutting operation incident to the next replenishing operation of the loom.

The fact that tube 46 is inclined downwardly and forwardly a slight amount enables gravity to return the weighted mass 49 to its normal forward position if it is not so returned by its momentum. Vibration of the loom during its operation will aid gravity to return the weight to its forward position.

From the foregoing it will be seen that the invention sets forth a simple cutter operated by the movement of a weight which is set in motion and then by its momentum effects operation of the cutter blade. The tube 46 has been shown in an inclined position, but this will not be necessary in all instances, and the tube may be horizontal where the conditions are such that the weight 49 will be returned by its momentum to its normal forward position in the tube. It will also be seen that the lock 70 permits spring 32 to give lever 29 a quick angular motion which

is not determined by the retarding forward motion of the lay as the latter approaches front center. While the lock has been described as aiding the movement of the weight **49** by its rearward momentum, it will not be necessary where the speed of the loom is such that the control member **33** moves forwardly fast enough to permit the weight to acquire a sufficient momentum to continue moving rearwardly after the transferrer arm comes to rest in its down position. The pull-back arms **36** and **37** have been shown in the shuttle as a means for insuring tautness of the thread, but the invention is not limited to use with a shuttle equipped with these pull-back arms. While the invention has been illustrated with particular reference to the cutting of the thread of the outgoing bobbin, certain features of the invention are not limited in their use to this thread.

Having thus described the invention it will be seen that changes and modifications of the foregoing specific disclosure may be made without departing from the spirit and scope of the invention.

What is claimed as new is:

1. In thread cutting mechanism for a weft replenishing loom having a lay and a thread to be cut on replenishing beats of the loom, a carrier which has a movement toward the lay and thread incident to a weft replenishing operation of the loom, a weighted mass supported by the carrier and having a free movement due to the momentum thereof relatively to the carrier incident to said movement of the carrier, and thread cutter means supported by the carrier moved toward the thread by the latter and operatively connected to the weighted mass and operated by the latter when the weighted mass has said free movement.

2. In thread cutting mechanism for a weft replenishing loom having a lay and a thread to be cut on replenishing beats of the loom, a carrier which has a movement toward the lay and thread incident to a weft replenishing operation of the loom, a weighted mass supported by the carrier and moving therewith and having a free movement due to the momentum thereof relatively to the carrier incident to said movement of the carrier, thread cutter means moved toward the thread by the carrier when the latter has said movement thereof, and operating connections between the weighted mass and cutter means effecting a thread cutting operation of the cutter means when the weighted mass has said free movement.

3. In thread cutting mechanism for a weft replenishing loom having a thread to be cut incident to a weft replenishing operation, a carrier which has a movement toward the thread and has said movement arrested incident to a weft replenishing operation of the loom, a cutter supported by the carrier for movement therewith toward the thread and mounted for movement relatively to the carrier, and a weighted mass supported by the carrier and having a free movement relatively thereto due to the momentum of said weighted mass incident to said movement of the carrier, said weighted mass due to said free movement thereof causing a thread cutting operation of the cutter when said movement of the carrier is arrested.

4. In thread cutting mechanism for a weft replenishing loom having a lay and a thread to be cut on replenishing beats of the loom, a carrier which has a movement toward the lay incident to a weft replenishing operation of the loom, a

cutter unit secured to the carrier and moving therewith and comprising a thread cutter blade movably mounted on the unit, a weighted member mounted on the unit for free movement relatively thereto and moving due to the momentum thereof with respect to the unit incident to said movement of the carrier, and operative connections between the cutter blade and weighted mass supported by the unit and causing a thread cutting movement of the blade when the weighted mass moves relatively to the unit.

5. In thread cutting mechanism for a weft replenishing loom having a thread to be cut incident to a weft replenishing operation, a cutter unit which has a movement toward the thread and has said movement arrested incident to a weft replenishing operation of the loom, a cutter supported by the unit for movement therewith toward the thread and mounted for movement relatively to the unit, and a weighted mass supported by the unit for free movement relatively thereto due to the momentum of said mass incident to said movement of the unit and effective due to said movement thereof to cause a thread cutting movement of the cutter when said movement of the unit is arrested.

6. In thread cutting mechanism for a weft replenishing loom having a thread to be cut incident to a weft replenishing operation, bobbin transfer mechanism normally at rest but having an operating movement on a weft replenishing beat of the loom, a thread cutter unit tending to move toward the thread, a lock normally preventing the unit from moving toward the thread, said transfer mechanism when having said operating movement thereof moving the lock to unlocking position, whereupon the unit has a movement toward the thread, and means dependent upon movement of the unit toward the thread effecting a thread cutting operation of the cutter unit.

7. In thread cutting mechanism for a weft replenishing loom having a thread to be cut incident to a weft replenishing operation, a control member having a back and forth movement through a given range of motion on weft replenishing beats of the loom, a thread cutter unit tending to have a movement toward the thread, a lock normally preventing said movement of the cutter unit and holding the unit in inoperative position and tending to move to locking position when moved to unlocking position, said control member when moving forwardly in said range of motion moving the lock to unlocking position, said cutter unit thereupon having a movement toward the thread, and means dependent upon said movement of the unit causing the latter to have a thread cutting operation, said control member when moving rearwardly in said range of motion effecting locking relations between the lock and unit to hold the latter in normal inoperative position.

8. In thread cutter mechanism for a weft replenishing loom having a thread to be cut on a weft replenishing beat of the loom, transfer mechanism including a control member moving from the normal position thereof to a transfer position thereof on weft replenishing beats of the loom, a lever having a control arm and a carrier arm, resilient means tending to move the carrier arm toward the thread, a lock normally engaging the control arm to prevent the carrier arm from moving toward the thread, cutter mechanism on the carrier arm including a cutter blade and a weight which by movement relative to the carrier arm operates the blade, said

control member when approaching the transfer position thereof on a replenishing beat of the loom acting on the lock to effect unlocking of the control arm and the resilient means thereupon moving the carrier arm toward the thread and causing the control arm to engage the control member to effect abrupt stopping of the rearward movement of the carrier arm, whereupon said weight due to the momentum thereof moves rearwardly relatively to the carrier arm and operates the cutter blade.

9. In thread cutting mechanism for a weft replenishing loom having a lay and a thread to be cut incident to a weft replenishing operation of the loom, a carrier in front of the lay having a rearward movement toward the lay on weft replenishing beats of the loom, a cutting unit mounted on and moving with said carrier and comprising a tubular member inclined downwardly and forwardly and having a cutter blade at the rear end thereof mounted for movement relatively to the tube, a weight slidable within the tube and tending due to gravity to move toward the forward end of the tube, and operating connections between the weight and the cutter blade causing movement of the latter relatively to the cutting unit when the weight moves rearwardly in said tube, said weight due to the momentum thereof incident to rearward movement of the carrier on a weft replenishing operation moving rearwardly within the tube and causing operation of a cutter.

10. In thread cutting mechanism for a weft replenishing loom having a lay and a thread to be cut incident to a weft replenishing operation of the loom, a carrier in front of the lay having a rearward movement toward the lay on weft replenishing beats of the loom, a tube mounted on and moving with the carrier and having the axis thereof inclined forwardly and downwardly, a weight freely slidable within the tube and tending by gravity to move toward the forward end of the tube, a cutter blade movably mounted on the tube near the rear end thereof, and operating connections between the weight and cutter blade including an element of serpentine form, said weight due to the momentum thereof incident to rearward movement of the carrier on a weft replenishing beat of the loom moving rearwardly in the tube and causing said serpentine element to move the cutter blade.

11. In thread cutting mechanism for a weft replenishing loom having a lay and a thread to be cut incident to a weft replenishing operation of the loom, a carrier in front of the lay having a rearward movement toward the lay on weft replenishing beats of the loom, a tube mounted on and moving with the carrier and having the axis thereof inclined downwardly and forwardly, said tube having thread receiving notches in the rear end thereof, a cutter blade movably mounted within the tube and having a cutting edge adjacent to said notches, a weight mounted for free movement in the forward end of the tube and tending due to gravity to move forwardly in said tube, and operating connections between the weight and the cutter causing operation of the latter when the weight moves rearwardly within the tube, said weight due to the momentum thereof incident to rearward movement of the carrier on a weft replenishing beat of the loom moving rearwardly in the tube.

12. A thread cutter unit for a weft replenishing loom having a carrier which moves incident to a replenishing operation of the loom, said unit comprising an elongated tubular member adapted for support by the carrier, a lever pivoted within the tubular member and having a cutter blade on one end thereof, a weighted mass slidably mounted within the tube, and a wire of serpentine form secured to the weighted mass and operatively connected to the other end of said lever to cause oscillation of the latter and cutter blade when the weighted mass moves within the tubular member.

13. A thread cutter unit for a weft replenishing loom having a carrier which moves incident to a replenishing operation of the loom, said unit comprising an elongated tubular member adapted for support by the carrier, a cutter blade within the tubular member mounted for movement relatively thereto, a weighted mass slidable within the tubular member, and operative connections between the weighted mass and cutter blade causing movement of the latter relatively to the tubular member when the weighted mass slides within said member.

14. A thread cutter unit for a weft replenishing loom having a carrier which moves incident to a replenishing operation of the loom, said unit comprising an elongated tubular member adapted for support by the carrier and having thread receiving notches in one end thereof, a cutter blade movably mounted within the member and having a cutting edge adjacent to said notches, a weight slidable in the other end of the tube, and operative connections between the weight and blade causing movement of the cutting edge relative to said notches when the weight slides within the tubular member.

15. A thread cutter unit for a weft replenishing loom having a carrier which moves incident to a replenishing operation of the loom, said unit comprising an elongated tubular member adapted for support by the carrier, a lever within the tubular member pivoted between the ends thereof for angular movement within the member, a cutter blade on one end of the lever adjacent to one end of the tubular member, an eye formed in the other end of the lever, a weight mounted for sliding movement within the tubular member adjacent to the other end thereof, and an operating element of serpentine form secured to the weight and extending through said eye and effective to oscillate the lever when the weight slides within the member.

16. A thread cutter unit for a weft replenishing loom having a carrier which moves incident to a replenishing operation of the loom, said unit comprising an elongated tubular member adapted for support by the carrier, a lever pivoted within the tubular member and having a cutter blade thereon, a weight slidably mounted within the tube, and a wire of serpentine form secured to the weight and operatively connected to said lever to cause oscillation of the latter and cutter blade when the weight moves within the tubular member.

17. A thread cutter unit for a weft replenishing loom having a carrier which moves incident to a replenishing operation of the loom, said unit adapted for support by the carrier and including a weight mounted for free movement on the unit, a thread cutter blade movably mounted on the unit, and operative connections between the weight and cutter blade moving the latter when the weight moves relatively to the unit.

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No references cited.