

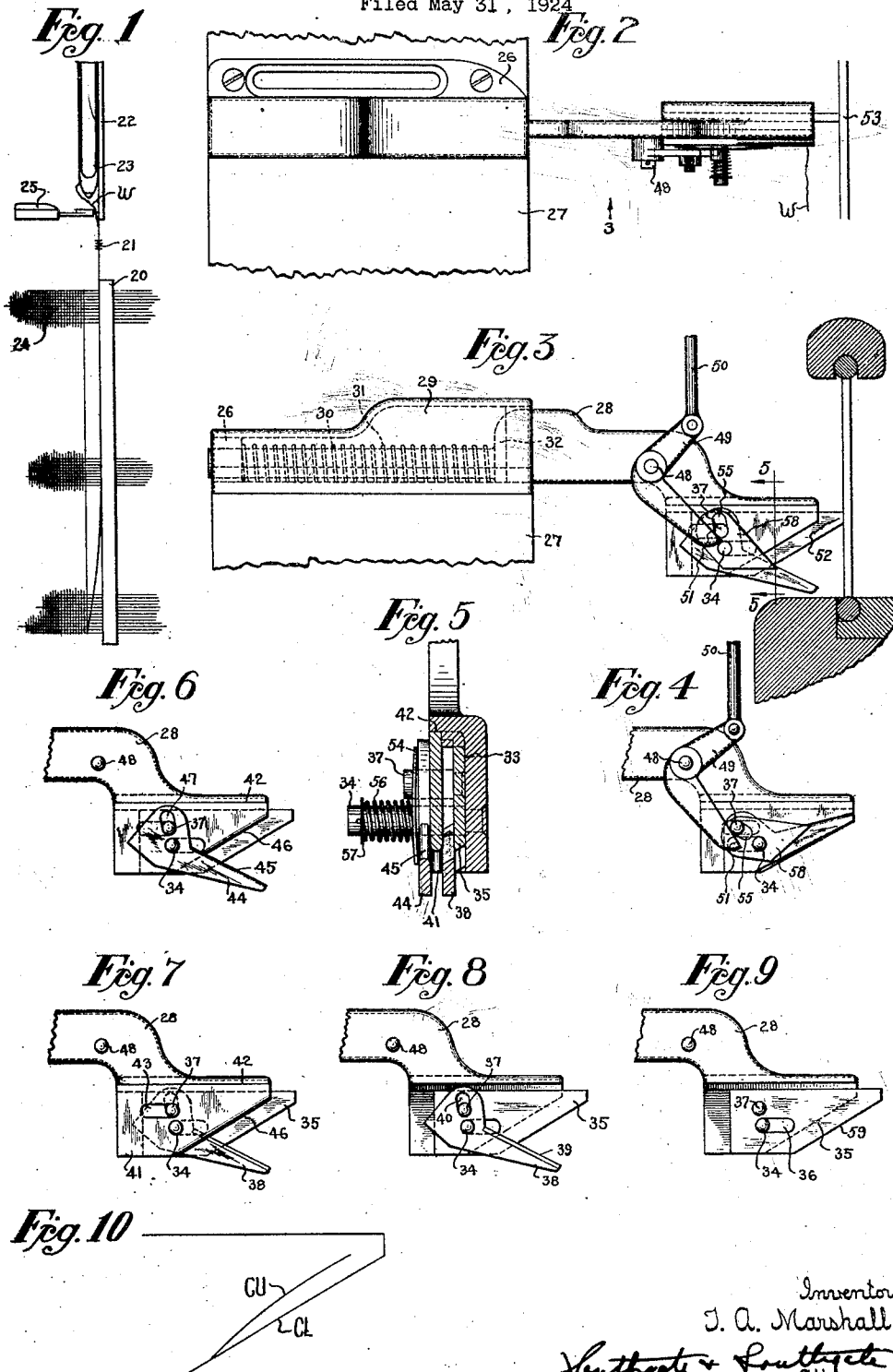
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COMBINED THREAD CLAMP AND CUTTER

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UNITED STATES PATENT OFFICE.

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COMBINED THREAD CLAMP AND CUTTER.

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To all whom it may concern:

Be it known that I, THOMAS A. MARSHALL, a citizen of the United States, residing at Rosemary, in the county of Halifax and State of North Carolina, have invented a new and useful Combined Thread Clamp and Cutter, of which the following is a specification.

This invention relates to a combined thread cutter and clamp such as may be employed on weft replenishing looms and more particularly to cutters which are set for operation by the replenishing mechanism at the time the new bobbin is to be placed in the exhausted shuttle.

In certain weft replenishing looms the thread cutter is placed between the side stop motion and the adjacent shuttle box, the thread at the time of cutting being disposed at an angle with respect to the reed and extending from the grid of the stop motion to the front of the shuttle. When a clamp is used it is desirable that it shall operate before the cutter to hold that part of the filling extending from the selvage to the cutter to prevent the same from being drawn into the cloth. When a clamp is placed as heretofore stated and has a jaw movable so that the point of clamping travels toward the lay as the latter advances, it is found that the thread is likely to be moved rearwardly by the traveling point of clamping so that the angle between the thread and the reed increases as the time of clamping is delayed. If the point of cutting moves rearwardly at the same rate as the point of clamping, the cutter may cut the thread before it is clamped because of the increasing angle of the yarn. Under such circumstances it is desirable that the point of cutting shall travel rearwardly at a slower rate than the point of clamping to prevent cutting too early. Also, as the lay beats up the yarn is likely to slacken, making it more difficult to be clamped, and for this reason also, it is desirable to cut later than the clamping when the latter is delayed.

It is, of course, desirable that the cutting occur as soon as possible but in any event it is necessary that the clamp operate before the cutter. Accordingly, it is one object of my invention to provide a combined thread cutter and clamp arranged so that as it starts to operate the point of clamping

will only slightly lead the point of cutting, but as it continues to operate the point of clamping will lead the point of cutting more and more as the time of clamping is delayed, the difference in the rate of travel between the two points increasing as the clamping of the thread is delayed.

Another object of my invention is to provide a pair of cutter members, one mounted for pivotal motion and the other for sliding motion, the sliding member operating to move the pivoted member angularly and also serving to draw the thread toward the point of cutting by its sliding movement.

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 set forth and described in the claim.

In the accompanying drawings, wherein one form of my invention is shown,

Fig. 1 is a diagrammatic view showing the reed and shuttle in the position they occupy just prior to beating in the filling, together with the filling stop motion and the cutter,

Fig. 2 is an enlarged view showing the cutter in plan,

Fig. 3 is a side elevation of the cutter as seen from the interior of the loom looking in the direction of arrow 3, Fig. 2, with the cutter set for operation,

Fig. 4 is a view similar to Fig. 3 but showing the cutter closed and in normal position,

Fig. 5 is an enlarged vertical section on line 5—5 of Fig. 3,

Fig. 6 is a view similar to Fig. 4 with the pressure distributor removed,

Fig. 7 is a view similar to Fig. 6 with the pivoted clamp removed,

Fig. 8 is a view similar to Fig. 7 but with both clamps removed showing the cutters,

Fig. 9 is a view similar to Fig. 8 with the pivoted cutter removed and showing the sliding cutter, and

Fig. 10 is a graphic view showing the relative rates at which the clamping and cutting points move with respect to each other as the pivoted clamp and cutter move about their centers.

Referring to Fig. 1, I have indicated the reed 20 and stop motion grid 21 in line therewith, together with box back 22

against which lies shuttle 23. The fell of the cloth is spaced forwardly of the reed, as indicated at 24, and the weft W is shown as extending from the farther selvage along the reed in front of the grid 21 and the cutter and clamp 25 to the front wall of the shuttle. It will be seen that the weft is disposed at an angle with respect to the line of the reed as it extends from the grid to the shuttle.

Referring more particularly to Figs. 2 and 3 it will be seen that I have provided a stand 26 fixed to the breast beam 27 and having mounted thereon slide 28 from which projects forwardly through housing 29 a shank 30 which is secured to the slide 28. A spring 31 acts between the forward end of stand 26 and the shoulder 32 of the slide, tending to hold the latter rearwardly but permitting forward motion thereof should the cutter be engaged by a misplaced shuttle. The slide 28 extends rearwardly and is undercut as shown at 33, Fig. 5, and has stud 34 riveted or otherwise secured thereto. Lying in the undercut portion 33 is a slidable cutter blade 35 shown in detail in Fig. 9 which is provided with a slot 36 through which the stud 34 passes and an actuator pin 37 secured thereto for a purpose to be described. Lying against the blade 35 and pivotally mounted on the stud 34 is a cutter blade 38 having a cutting edge 39 and provided with an angularly disposed slot 40 through which extends the actuator pin 37. The slot extends radially from the pivot of the blade and preferably lies to the right of and above the stud 34 when the cutter is closed.

A fixed clamping plate 41 lies against the pivoted cutter and has an upper edge 42 fitting against the slide 28 and extending on both sides of the stud 34 which passes through it and by means of which it is held in position. The clamping plate 41 is also provided with a slot 43 substantially parallel to the upper edge of the sliding cutter to permit back and forth motion of the actuator pin 37 which extends therethrough. Pivoted upon the stud 34 on that side of the fixed clamp opposite the cutters is a pivoted clamp 44 having a clamping surface 45 to cooperate with the clamping surface 46 of the fixed blade. The pivoted clamp is provided with a slot 47 similar to slot 40 and through which extends the actuator pin 37 carried by the sliding cutter. The pivoted clamp 44 and the pivoted cutter 38 are substantially the same in contour and as to the location of the openings therethrough.

Pivotally mounted on the carrier 28 as at 48 is a bell crank lever 49 one end of which is controlled by a rod 50 operative by the replenishing mechanism and the other end of which extends downwardly in contact with the rod 37, as at 51.

As shown in Fig. 3 the rear end of the sliding cutter is extended as at 52 to be engaged by a solid abutment 53 on the lay when the cutter has been opened preparatory to cutting the filling. This abutment 70 may be a part of the box back or lay sword or any other convenient part of the lay.

In order that the various parts may be held together I provide a pressure distributor 54 which is pivoted on stud 34 and has a slot 55 through which passes the actuator pin 37. A spring 56 is interposed between the distributor and a washer 57 on the outer end of the stud 34. By means of spring 56 the cutter and clamp parts are held in close relationship, the distributor having an end 58 which extends toward the points of the pivoted clamp and cutter to insure cutting and clamping at the extreme ends of said members. The pressure distributor may be curved or bowed as indicated in Fig. 4 to accomplish this result.

The cutting edge 59 of the sliding cutter and the clamping edge 46 of the fixed clamp are substantially parallel in all positions of the former and the position of the cutting edge 59 is slightly forward of the clamping edge 46 when the cutter is open so that the intersection between the clamping surfaces is to the rear of the crossing of the cutting edges. In this way provision is made for clamping the filling before it is cut.

Under normal conditions, the sliding cutter blade is in extreme forward position with the pivoted clamp and cutter in raised or closed position, as shown in Fig. 4. With the cutter in this position the thread extending from the selvage to the shuttle passes under the lower edges of the clamp and cutter members, the rod 50 being in lower position and the lower end of bell crank lever 49 being forward. At indication of transfer of weft the rod 50 will be raised in any convenient manner, as for instance by a connection with the top shaft of the mechanism indicated in the patent to Ryon, No. 1,030,748. When the rod 50 is lifted the lever will swing about its center 48 and the lower end thereof will move the actuator pin 37 rearwardly which will slide the cutter blade 35 toward the lay. The action of pin 37 against the edges of slots 40 and 47 will lower the pivoted cutter 38 and the clamp 44 respectively, so that they will assume the position shown in Fig. 3. As the lay beats up the filling will enter the jaw of the cutter and will extend to the front wall of the shuttle. As the lay continues to advance the abutment 53 will strike the rear end 52 of the sliding cutter and move the same forwardly, the result of this action being to swing the cutter 38 and the clamp 44 about the stud 34 because of the action of the actuator pin 37 moving through the slots 40 and 47, respectively.

It will be noted that the clamp member 41 is fixed so that the point of clamping defined by the crossing of the clamping edges 45 and 46 moves rearwardly along a stationary line, whereas the point of cutting defined by the crossing of the cutting edges moves along the cutting edge 39 which is moving forwardly with respect to the clamping edge 46. The result of this construction is that the point of cutting moves rearwardly at a slower rate than the point of clamping. The result of this action is that as the angle which the thread assumes as it moves rearwardly while slipping on the clamp becomes greater with respect to the line of the reed and as the thread slackens, the cutting point will lag behind the clamping point and the distance between the points will vary approximately according to the delay in clamping.

In Fig. 10 I have shown graphically the relation between the travel of the clamping and cutting points as they travel rearwardly. The lines CL and CU represent the clamping and cutting points, respectively, the horizontal displacement between the lines indicating the interval between clamping and cutting.

From the foregoing it will be seen that I have provided a cutter and clamp both actuated from one of the cutter members and so related that the point of clamping moves rearwardly more rapidly than the point of cutting. It will also be observed that the act of cutting is assisted by having one of the cutter blades movable in a direction toward the other so that by its engagement with the thread the latter will be drawn into the bight between the cutter blades.

Having thus described my invention it will be apparent 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 disclosed herein, but what I claim is:

In a combined thread clamp and cutter for a loom having a lay, a support, a cutter member slidable on the support, a pivoted cutter element mounted for angular motion on the support, a clamping member fixed with respect to the support, a pivotal clamping element mounted on said support for angular movement about the axis of said pivoted cutter member, a pressure distributor mounted for pivotal movement about the axis of the pivoted cutter element, means to hold the distributor yieldingly against the pivoted clamping element, and an actuating pin extending from the slidable cutter member through the fixed clamp member and through slots formed in the pivoted elements and distributor, the slots in the elements and distributor being oblique with respect to the direction of movement of the sliding cutter, the rear end of the sliding cutter projecting rearwardly beyond the clamping member when the cutter is to operate to be engaged by the lay when the latter moves forwardly, and the actuating pin moving the pivoted elements and distributor with respect to the slidable cutter member and fixed clamping member as the lay advances.

In testimony whereof I have hereunto affixed my signature.

THOMAS A. MARSHALL.