This invention relates to improvements in selvage trimmers for drop box looms and it is the general object of the invention to improve these devices so that the usual form of lay may be employed at the drop box end of the loom.

In drop box looms there are employed two or more shuttles of which one is active and the remainder inactive. In order that weaving may continue when an inactive shuttle is returned to action it is necessary that the weft ends be anchored at some point, and this ordinarily the selvage of the cloth in the usual form of bobbin box loom. If a shuttle remains inactive for a large number of picks and then returns to action it forms a loop which must later be trimmed.

When a shuttle moves down to inactive position there is a chance that its weft end will extend across the race of the lay to be broken by the active shuttle. In order to prevent this breakage it is customary either to omit the box mouth from the lay and make it a part of the shifting shuttle boxes, or, if a box mouth is employed on the lay, it is open at the front so that the weft end can extend from the selvage down in front of the lay to the idle shuttle beneath the cloth without extending across the race.

Where a clamp is employed to hold the weft of an idle shuttle it is desirable that it be placed near the shuttle boxes as possible so as not to interfere with varying widths of cloth woven in the loom. It will be understood, however, that the angle which the weft ends form as they lead from the selvage to the highest and lowest idle shuttles gets wider as the ends approach the shuttle boxes, and in a four-shuttle loom the angle may be so wide as to require an unwieldy thread clamp. It is an important object of my present invention to provide means for confining the thread to a zone of small compass which will permit the use of a comparatively small clamp and at the same time permit the location of the clamp at a point substantially removed from the selvage and in the vicinity of the shuttle boxes.

In order to prevent the thread extending to the idle shuttle from lying over the shuttle race, I place the clamp so that it is in front of the lay and so located that a thread extending from it to the idle shuttle will have no opportunity to fall on the shuttle race. The distance between the breast beam and the lay when the latter is in its extreme forward position on certain types of looms does not permit the mounting of the clamp on the lay in such a position that it will always hold the weft ends in front of the lay. It is accordingly a further object of my invention to mount the clamp independently of the lay so that the same may be located relatively close to the lay when the latter is in front position, but movable forwardly relatively to the lay so as to prevent the weft ends from falling on the shuttle race during the time that the lay is in picking position. One form of my invention is adaptable to looms where the minimum distance between lay and breast beam does not require a rear movement of the clamp relatively to the lay, in which case the clamp is given a rearward movement each pick.

Because of the varying widths of the reeds used in loom lays and the consequent uncertainty as to whether sufficient room behind the reed line will be available for the movement of the clamp transverse of the lay, I prefer to use a clamp which moves in a plane parallel to the loom reed. As the lay moves rearwardly the weft end assumes a diagonal position with respect to the lay, thus coming within the range of the clamp. The clamping is preferably operated after the active shuttle has been picked so as not to catch the thread of the active shuttle.

It is a further object of my invention to provide a pair of thread engaging fingers or the like which will swing to a position from the selvage toward the boxes to engage the weft thread of an idle shuttle and bring the same within the field of action of the clamp. The angle which is defined by the upwardly and downwardly extending threads has its vertex at the selvage and the fingers extend one above and the other below the cloth so as to locate the idle weft between them and the
path of movement of the clamp preferably covers a zone which is somewhat larger than the distance between the two fingers.

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 claims.

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

Fig. 1 is a diagrammatic view of a loom showing the various parts of my invention applied thereto, the preferred form of cam being shown.

Fig. 2 is a detailed front elevation of the drop box end of the loom taken in the direction of arrow 2, Fig. 1, and showing the clamp open.

Fig. 3 is an end elevation taken in the direction of arrow 3, Fig. 2 showing the manner in which the fingers control the weft.

Fig. 4 is a vertical transverse section through a part of the loom showing my invention applied thereto in two different positions, certain parts being removed for the sake of clearness.

Fig. 5 is a top plan view taken in the direction of arrow 5, Fig. 4.

Fig. 6 is a detail horizontal section taken on line 6—6 of Fig. 2, and showing the manner of operating the weft fingers by the clamp.

Fig. 7 is a detail diagrammatic view showing a modified form of cam to be used when the clamp moves rearwardly each pick of the loom.

Referring to the drawings, I have shown a loom frame 10 having a lay 11 and a breast beam 12. The usual bottom shaft is shown at 13, while the connections between the lay and the top shaft together with the latter are omitted. The lay carries box guides one of which is shown at 14 to receive a gang of boxes 15 shown herein as having four cells 16, 17, 18 and 19, respectively. The drop boxes are raised and lowered by mechanism not shown but well understood in the art so that any one of the four cells can be moved to picking position in alignment with the race plate 20 of the lay.

During operation of the loom the shuttles will be called into action one after another depending upon the pattern, certain of the shuttles always being idle and located either above or below the race plate. It is to be understood with reference to Fig. 1 that the lay moves back and forth between the full and dotted line positions and that the shuttle is picked when the lay is about midway between these positions and moving rearwardly.

As shown in Fig. 5 the cloth C has a fell F which is formed by the reed R of the loom. When the lay is on front center or in its extreme forward position the wefts will assume the position shown generally at W in Fig. 5, whereas when the lay is in its extreme rearward position the threads will assume a more oblique position such as indicated at W' in the same figure.

The matter thus far described is common in box looms and of itself forms no part of my present invention.

In carrying my present improvements into effect I provide two separate mechanisms one of which is a thread placer to act on the weft ends extending from the selvage to the idle shuttles to cause said weft ends to pass through a relatively small area at a point considerably removed from the selvage, and the other mechanism being a clamp to hold the weft ends after they have been so placed. The thread placer comprises an upright shaft 30 rotatably mounted in a pair of spaced vertically aligned bearings 31 and 32 which may be held in any approved manner to the loom frame. A collar 33 is secured to the shaft and receives one end of a twist spring 34 the other end of which is received by the top bearing 31. The effect of said spring is to turn the shaft in a right hand or clockwise direction as viewed in Fig. 5. To the upper end of this shaft is secured a head 35 from which project upper and lower fingers 36 and 37, respectively. These fingers lie one above and the other below the cloth C and are limited in their forward movement by a thread cutting temple T which engages one or the other of said fingers, preferably the upper one.

As shown in Fig. 2 the angle which is defined by the weft ends extending to the extreme upper and lower positions has its vertex between the fingers so that no matter what angular position the weft end may assume with respect to the cloth and the lay it will start from a point which is vertically between the two fingers. Therefore, as the latter swing from the full to the dotted line position shown in Fig. 5, the thread of the previously active shuttle will be engaged by one or the other of the fingers, depending upon the direction of shift of the shuttle boxes. As shown in Fig. 2 an upwardly extending thread is moved from the position shown at A in full lines to that shown at B in dotted lines and it is to be understood that a similar bend or deflection would be produced in the weft of any shuttle regardless of the direction in which it had been moved from active position.

The second mechanism constitutes a clamp and includes a bell crank lever 40 pivotally movable about a fixed axis 41 held in any approved manner to the loom frame. A link 42 connects the lower arm 43 of this lever with an actuating lever 44 pivoted as at 45 to a second fixed pivot. The rear end of the actuating lever is held against an actuating cam 47 of preferred form by means of a.
tension spring 48, the cam being secured on and adjustable with respect to the bottom shaft 13.

The upwardly extending end 50 of the lever 40 as shown more particularly in Figs. 2 and 3 is provided with a pair of spaced slide bearings 51 and 52 through which extend a push rod 53. A collar 54 adjusablv secured to the rod receives the downward thrust of a compression spring 55 the effect of which is to lower the rod so that a second collar 56 also fixed to the rod will engage the lower bearing and act as a stop to limit downward movement of the rod 53. The upper end of the rod is formed as a rack 57 which meshes with a small pinion 58 secured to a clamping blade 59 and movable about an axis 60 secured to the lever arm 50.

As shown in Figs. 2, 3 and 6 I provide the arm 50 with a clamping surface 61 and mount on the arm a welding clamping element 62 which defines with the surface a notch for the reception of the clamp 59. The members 61 and 62 extend vertically and below the lower finger, but I claim no novelty for the specific form of these members. The lower end of the rod has a laterally extending foot 63 which is adapted for engagement with a trip 64 secured to the loomside.

In operation, when the lay is in forward position on front center as shown in full lines in Fig. 5, the twist spring 34 will hold the fingers 35 and 37 in their forward position and the clamp will be as near the lay as convenient to permit the latter to approach the breast beam. When the parts are in this position the weft W will extend across the shuttle race or top of the lay from the selvage toward the active shuttle. As the lay moves rearwardly from the full toward the dotted line position shown in Figs. 1 and 4 the boxes will complete their shifting movement, carrying the previously acting shuttle either to a position above or below the shuttle race 20.

During this backward movement the clamp will also start to move rearwardly, but at a slower rate than does the lay, to permit the arm 50 to engage and impart movement to the fingers and turn them rearwardly against the action of spring 34 without requiring the rear ends of said fingers to engage the reed.

After the active shuttle has been picked the thread placing fingers and clamp may move rearwardly at the same rate as does the lay, or at any other desired rate. The preferred form of the cam is so timed as to cause engagement of the foot 63 with the trip 64 during the backward movement of the clamp after the active shuttle has been picked so that the only thread extending from the adjacent selvage is that leading to the idle shuttle. The resultant downward movement of the clamp toward the members 61 and 62 takes place while the thread is in diagonal position indicated in dotted lines at W in Fig. 5, and in full lines in Fig. 6, so that although said clamp moves in a plane substantially parallel to the lay the thread will nevertheless be disposed obliquely with respect to said clamp and be acted upon by the latter. The range of movement of the clamp extends preferably above and below the fingers 36 and 37. As soon as the thread has been moved between the members 61 and 62 by the clamp it will be held by said members so that subsequent removal of the blade 59 will not withdraw the thread.

During the forward movement of the lay while the clamp is still between the members 61 and 62, the spring 55 will act to lower the rod 53 relatively to the arm 50 and thereby gradually move the blade 59 upwardly to the full line position shown in Fig. 2. During this forward movement of the lay the fingers will also be moved from the dotted to the full line position shown in Fig. 5 by the action of spring 34.

It is to be understood that the turning movement of the fingers about their vertical axis is due to engagement of the lever 50 with one of said fingers as indicated in Fig. 6, and it is further to be understood that cam 47 can be shaped to produce the movements already described in connection with the clamp. It is also to be understood that the active shuttle is on the drop box side of the loom only on alternate beats and it is therefore sufficient to have the motions already described in connection with the fingers and clamp take place only on those beats of the loom when the active shuttle is in its drop box cell. To accomplish this result the cam 47 may be formed with a low dwell 70 which will permit the thread placing and clamping mechanisms to remain in forward position while the shuttle is being picked from the opposite side of the loom. In this connection it is further to be noted that the cam is so formed as to delay rearward movement of the clamp on that pick of the loom when the shuttle leaves the drop boxes not only for the purposes already described, but also to permit the active shuttle to pass to the right of the cutting temple as viewed in Fig. 5 before the fingers are projected across the path of the shuttle.

One important advantage to be derived from delaying rearward movement of the clamp as the lay moves backwardly is to draw the thread from the clamp to a position forward of the shuttle race so that said thread may move downwardly into the space 75, see Fig. 5, should the active shuttle be shifted downwardly. Subsequent passage of the active shuttle over the shuttle race will therefore not abrade the weft end extending from the clamp to the idle shuttle.

As the cloth feeds forwardly the cutting temple will cut that part of the weft extend-
from the clamp to the selvage. It is desirable to have the front and back positions of the clamp such that the point of attachment of the weft with the selvage is approximately midway between these positions, to prevent the thread from being pulled out of the retainer 62 when the clamp moves forwardly.

When a shuttle which has previously been rendered idle returns to action its weft end is attached to the clamping member and weaving may therefore continue, this end extending from the clamp toward the cutting temple after the shuttle has entered the shed so that during continued forward movement of the cloth said end will also be cut by the temple cutter.

When it is desired to have the clamp move rearwardly each pick of the loom, the cam 80 may be employed having two similar rises 81, as shown in the modification illustrated in Fig. 7.

From the foregoing it will be seen that I have provided a selvage trimming device including two separate mechanisms one of which places the thread in a comparatively restricted or narrow zone or area so that it can be acted upon by the other or clamping mechanism, the point of clamping being removed from the selvage a considerable distance so that cloths of varying widths can be woven on the same loom without disturbing the mechanism. It will also be seen that the two mechanisms are so constructed that a weft end can extend downwardly in front of the lay through the opening 75 when a shuttle is shifted from active position downwardly to an idle position, thereby preventing abrasion by an idle shuttle. It will furthermore be seen that the thread placer and clamp may be controlled by their operating cam so as to move rearwardly only on those beats of the loom when there is a weft end extending from the selvage toward the shuttle boxes, the devices being in normal forward position when the shuttle arrives in the drop boxes to be out of the path of said shuttle. By mounting the mechanisms independently of the lay I am enabled to gain the advantage of a shuttle mouth on the lay so far as positioning of the thread is concerned without having the disadvantage incident to a fixed shuttle mouth on 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 a selvage trimmer for a loom having a lay movable back and forth and a thread cutting temple, shifting shuttle boxes movable vertically on the lay and each capable of being in idle position, a thread placing mechanism normally in retracted position adjacent the selvage, a clamp mechanism mounted independently of the lay and movable rearwardly in a plane parallel to the plane in which the lay moves, and means to move the placing mechanism from the temple toward the boxes to place the weft of an idle shuttle within the range of movement of the clamping mechanism.

2. In a selvage trimmer for a loom having a lay movable back and forth and a thread cutting temple, shifting shuttle boxes movable vertically on the lay and each capable of being in idle position, a weft-end clamp to seize the thread extending from the selvage to an idle shuttle, and a thread placer movable from the selvage to the clamp to place the thread into operative relation with the clamp prior to operation of the latter.

3. In a selvage trimmer for a loom having a lay movable back and forth and a thread cutting temple, shifting shuttle boxes movable vertically on the lay and each capable of being in idle position, a weft-end clamp independent of the lay movable rearwardly with the lay during the latter part of the rear motion thereof, and a thread placer movable from the selvage toward the boxes as the lay moves rearwardly to place the weft end of an idle shuttle in operation position relatively to the clamp.

4. In a selvage trimmer for a loom having a lay movable back and forth and a thread cutting temple, shifting shuttle boxes movable vertically on the lay and each capable of being in idle position, a weft clamp mounted independently of the lay, means to move the clamp rearwardly to clamping position after the lay has reached picking position in its rearward movement, and a thread placer to move from the selvage toward the shuttle boxes to move a weft end extending from the selvage cutter to an idle shuttle in the range of operations of the clamp.

5. In a selvage trimmer for a loom having a breast beam and a lay movable toward and from the breast beam, a set of shifting shuttle boxes on the lay each capable of being in idle position, a clamp independent of the lay and located between the latter and the breast beam, means to hold the clamp stationary during the latter part of the movement of the lay toward the breast beam, other means to move the clamp from the breast beam toward the lay when the latter has passed picking position, and a thread placer movable from the selvage toward the boxes to place the weft of an idle shuttle in operative position relatively to the clamp.

6. In a selvage trimmer for a loom having a breast beam and a lay movable toward and from the breast beam, a set of shifting shuttle boxes on the lay each capable of being in idle position, a clamp independent of the lay and
located between the latter and the breast beam, means to hold the clamp stationary during the latter part of the movement of the lay toward the breast beam, other means to move the clamp from the breast beam toward the lay when the latter has passed picking position, and a thread placer movable in the direction of the length of the lay from the selvage toward the boxes to place the weft of an idle shuttle in operative position relatively to the clamp.

In testimony whereof I have hereunto affixed my signature.

CLARENCE R. KRONOFF.