Sept. 2, 1952 J. HAEFLIGER 2,609,009

TWISTED SELVAGE CUTTER

Filed Oct. 28, 1950 2 SHEETS—SHEET 1

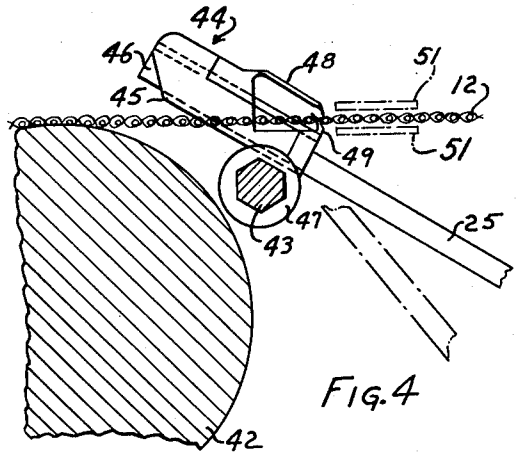



FIG. 4

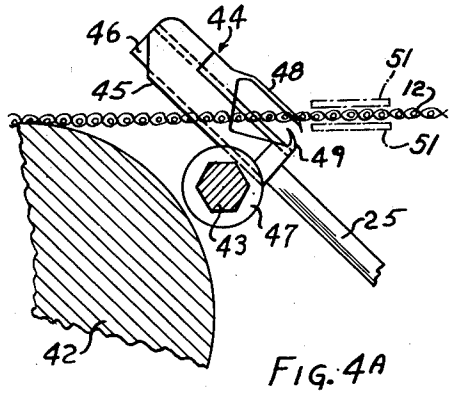



FIG. 4A

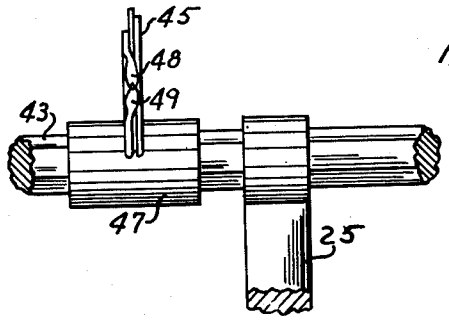



FIG. 5

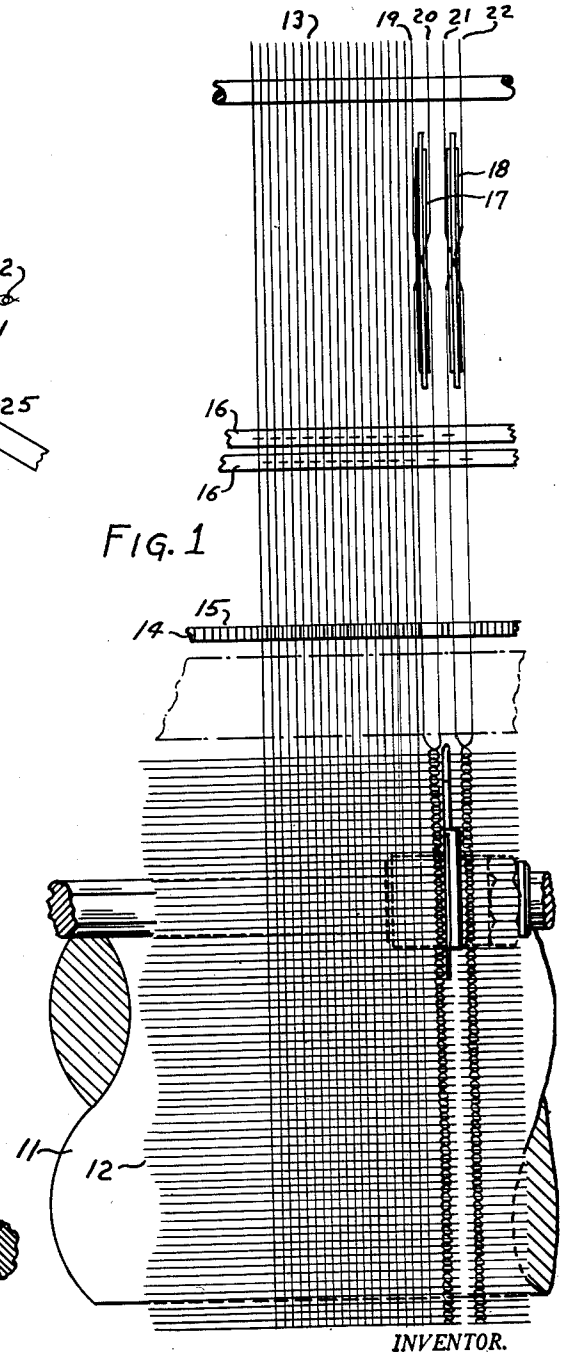



FIG. 1

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Sept. 2, 1952 J. HAEFLIGER 2,609,009

TWISTED SELVAGE CUTTER

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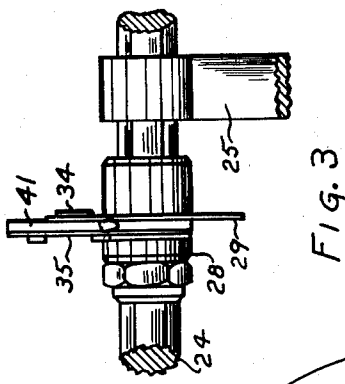



FIG. 3

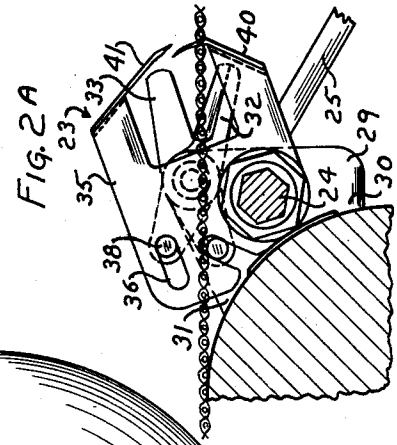



FIG. 2A

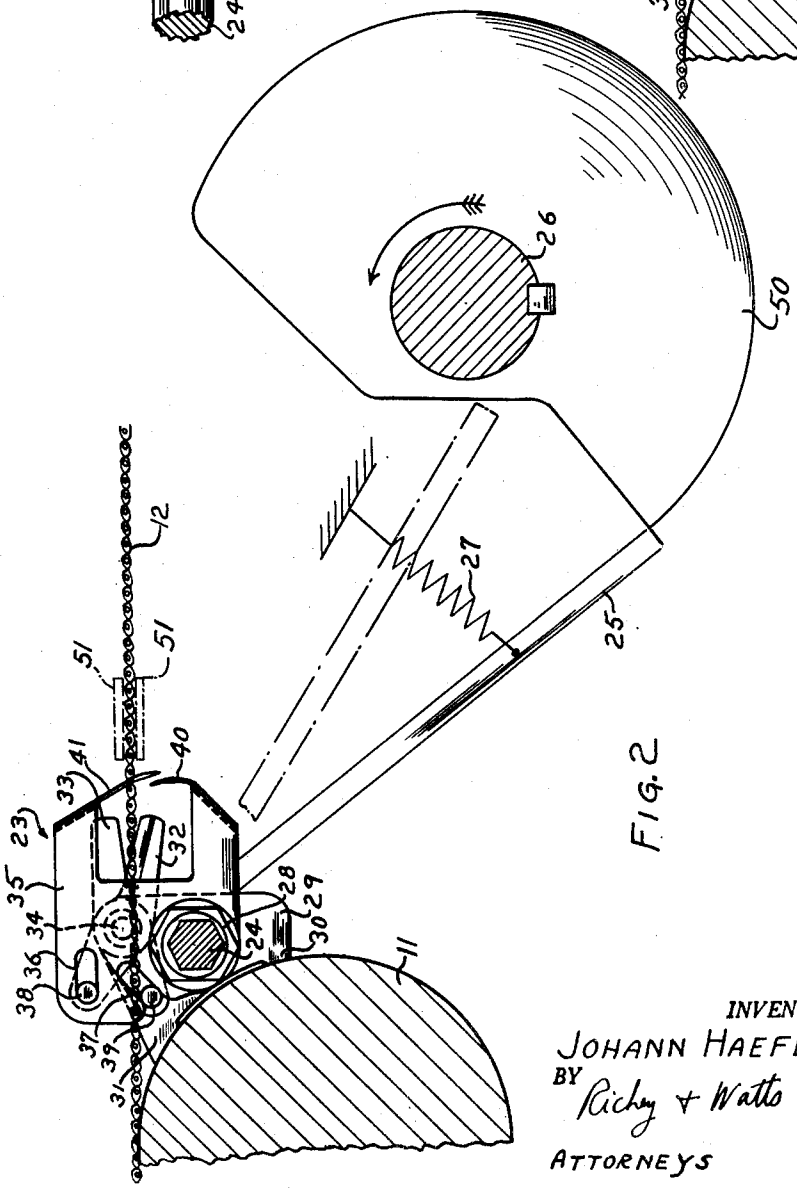



FIG. 2

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# UNITED STATES PATENT OFFICE

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## TWISTED SELVAGE CUTTER

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16 Claims. (Cl. 139—291)

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This invention relates to the weaving of textiles and, more particularly, to improved methods and apparatus for trimming and cutting.

An object of the invention is the cutting of weft threads under the guidance of binding threads.

An object of the invention is to slit cloth longitudinally as it is being woven.

A further object of the invention is to enable a cloth cutter to follow irregularities in the edge or in the direction of the warp threads of the cloth.

A still further object of the invention is the provision of apparatus which will carry out the cutting operation accurately and evenly and without undue distortion and strain of the cloth at the cutting point.

In the practice of the invention, a novel cutter is mounted upon a shaft extending crosswise of the loom. The shaft is oscillated by a suitable cam or other device and the cutter is actuated by the oscillation of the shaft, while being free to slide along the shaft under the influence of a guide which forms a part of the cutter. The guide comprises oppositely disposed prongs which reciprocate in the plane of the cutter blade and alternately pass through the interstices between the weft threads of the cloth. Binding threads, which are woven into the cloth at either side of the line along which the cloth is to be cut thus impose lateral constraints upon the guide prongs which in turn constantly position the cutter along the shaft. Alternative embodiments of the invention incorporate distinct forms of cutters, one type involving the use of shears and the other a single reciprocating blade.

These and other objects, aspects and features of the invention will be more readily apparent from a consideration of the following detailed specification and appended claims, taken in connection with the accompanying drawings, in which:

Fig. 1 is a schematic diagram representing a plan view of a portion of a loom illustrating the method of employment of the invention;

Fig. 2 is an elevation view of one embodiment of the cutter of the invention and showing a longitudinal section of the cloth being trimmed;

Fig. 2A is a view showing the guide of Fig. 2 in an alternate operative position;

Fig. 3 is a rear view of a portion of the apparatus of Fig. 2;

Fig. 4 is an elevation view of an alternative embodiment of the invention;

Fig. 4A is a view showing the guide of Fig. 4 in an alternate operative position; and

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Fig. 5 is a rear view of a portion of the apparatus of Fig. 4.

Referring now to Fig. 1, there is shown a conventional breast beam 11 over which there is drawn a cloth consisting of weft threads 12, spacing between which is exaggerated for clarity in the drawing, and warp threads 13, only a few of which are shown, also with exaggerated spacing for simplicity in the drawing. There is a conventional reed 14, schematically represented, including dents 15, only some of which are indicated, and a conventional heddle harness, including a plurality of heddle frames 16 two of which are schematically indicated. It will be understood that warp threads 13 are drawn from a warp beam (not shown).

In weaving looms of the gripper shuttle type having stationary bobbins, it is customary to cut off the weft thread after each beat-up stroke of the lay and to provide a false selvage by turning in the cut-off ends of the length of weft thread, or a twisted selvage, consisting of one or more pairs of twisted warp or binding threads, may be formed at the edges of the cloth to hold the ends of the weft threads.

Pairs of binding threads may be worked into the cloth by the use of conventional selvage twisting disks 17 and 18. The disk 17 is arranged to twist a pair of binding threads 19 and 20 and is located to be adjacent the sidemost of the ordinary warp threads 13. The disk 18 is arranged to twist a second pair of binding threads 21 and 22 spaced from the pair of binding threads 19 and 20. As shown, the binding threads pass through openings in the disks 17 and 18.

The twisting disks 17 and 18 may be arranged to rotate continuously for twisting the binding threads, or to rotate a predetermined number of revolutions in one direction and a predetermined number of revolutions in the opposite direction, in accordance with conventional practice. One means of mounting such twisting disks is illustrated in United States Patent No. 2,399,880 issued May 7, 1946 to A. Moessinger.

Where a twisted selvage is provided, or binding threads are used, the protruding ends of the weft threads are made unduly long for a finished cloth in order that the weaving and selvage forming operations may be carried out reliably. In order to cut off the excess length of the weft thread after the cloth has been woven, the cloth may be woven with a pair of spaced parallel sets of binding threads or twisted selvages, one of which is at the edge of the closely woven cloth and the other of which is to be trimmed away. In types of cloth where raveling is not a consideration, the

pair of binding threads nearer the closely woven cloth may be omitted. The trimming knife is then run between the two sets of binding threads close to the inner one, or between the outer binding threads and the rest of the cloth, so producing a cloth with a neat, close-cut edge. Likewise when two or more narrow fabrics are to be woven simultaneously on a wide loom, pairs of spaced binding threads without intermediate ordinary warp threads may be provided between what are eventually intended to be separate widths of cloth and a slitting knife may be run between the pairs of binding threads, in order to separate the woven material into independent widths of cloth.

The ordinary weaving processes may produce cloth with some lateral deviation of the warp threads or irregularities therein instead of perfectly straight warp threads. Likewise, the binding threads or twisted selvage threads do not always run evenly, and, especially at the edges of the cloth, there may be irregularities rendering it difficult for an operator to run a slitting knife close to the binding threads or between pairs of binding threads without inadvertently cutting into the binding threads or otherwise injuring some of the fibers and damaging the cloth. Furthermore, the protruding weft thread ends cannot be made of equal length by the conventional method of employing a slitting knife, nor by means of scissors if hand cutting is resorted to.

The present invention serves to overcome the difficulties in causing the blade of the selvage-trimming or cloth-slitting cutter to travel between the pairs of binding threads 19 and 20 and 21 and 22. As shown in Figs. 2 and 3, the apparatus of the invention includes a cutter 23 mounted upon a shaft 24 which is positioned adjacent the breast beam 11 and extends the width of the loom.

The shaft 24 is given a generally oscillatory motion by a lever 25, mounted upon the shaft 24, and a cam 59 mounted upon a rotating shaft 26. The cam may be of the general form indicated although any suitable cam arrangement may be utilized within the spirit of the invention in order to obtain a proper actuation of the lever and the cutter. A spring 27 serves to provide a restoring force for the return of the lever 25 after actuation by the cam.

The cutter 23 includes a collar 28 which is formed to slide freely along the shaft 24. As indicated, the shaft 24 and the interior opening of the collar 28 are of polygonal cross section in order that the cutter may be free to slide along the shaft while receiving the rotational impulses imparted by the lever 25. Other suitable means such as a tongue and groove arrangement may be utilized to accomplish the same purpose.

Mounted upon the collar 28 is a vertical body plate 29 which is formed in a generally arcuate fashion with two extended portions 30 and 31 which cooperate with the outer surface of the breast beam 11. The collar 28 rotates freely in the associated opening in the plate 29, the breast beam 11 serving to constrain the plate against rotation with the collar, while the collar holds the plate in a vertical position.

Two cutter blades 32 and 33, which form a shears, are supported from the body plate 29 by a bearing stud 34. The cutter blades are actuated by a guide plate 35 which is secured firmly to the collar 28 and rotates therewith. Skew grooves 36 and 37 formed in the plate 35 cooperate with pins 38 and 39, respectively, so that the oscillation of the support plate causes a reciprocation of the cutter blades and a shearing action.

The guide plate 35 serves also as a support for two oppositely disposed guide prongs 40 and 41, the plate forming arms which are bent at the ends so that the prongs lie in the plane of the shears. The guide prongs are of a suitable width, as will be understood from Figs. 1 and 3, while the ends of the prongs are formed with slightly rounded portions and separated ends so that the oscillation of the guide plate causes the alternate entry of the guide prongs into the interstices between the weft threads. The ends of the prongs are in slightly overlapped vertical relationship so that the cloth is continually traversed by one of the prongs, whatever the position of the cutter and guide.

In operation, the rocking of the guide plate 35 due to the oscillation of the shaft causes the guide prongs 40 and 41 to alternately pass through the fabric. The guide prongs pass readily between the weft threads while, due to the shape of the end of the prongs and their vertically overlapped relationship, the binding threads 19 and 20, and 21 and 22, constantly impart an adjusting force to the guide. The cutter is thus caused to slide along the shaft 24 in conformity with the lateral variations of the cloth and the shears constantly sever the weft threads along the desired line.

There is shown in Figs. 4 and 5, an embodiment of the invention incorporating an alternative form of cutter. In the apparatus there shown, a breast beam 42 and a cutter shaft 43 correspond to the breast beam 11 and cutter shaft 24, respectively, of Figs. 2 and 3 and function in an identical fashion. The cutter 44 comprises a body member 45 which may be of split construction to support and hold a single blade 46. The body member is securely attached to a collar 47 which slides along the shaft 43 but rotates therewith just as the collar 28 previously referred to. Two guide prongs 48 and 49 are formed integrally with the body member and are shaped somewhat differently in the longitudinal plane, being somewhat more hooked, than the guide prongs of the embodiment previously described. It will be apparent that the radial and angular traverse of the hooks when in operation must determine their specific form. The manner of operation of the cutter is similar to that of the embodiment of Figs. 2 and 3 the only difference being that the weft threads are severed by the reciprocation of the blade 46 taken with the longitudinal motion of the cloth, rather than by a shearing action.

It is to be understood that in Fig. 2, the cam shaft 26 is driven synchronously with the shedder mechanism. Such an arrangement is not essential, however, and any desired practical number of threads may be cut at each stroke of the cam. Further, while the specific embodiment of Fig. 2 utilizes the breast beam as a means of rotational constraint for the cutter body plate, such is not essential and other arrangements may be used.

The foregoing description is necessarily of a detailed character in order that the specific embodiment of the invention may be completely set forth. It is to be understood that the specific terminology is not intended to be restrictive or confining and that various rearrangements of parts and modifications of detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

What is claimed is:

1. In a loom of the type which utilizes spaced binding threads in the cloth being woven, a blade, means for actuating said blade, and means for guiding said blade comprising oppositely disposed prongs connected to said actuating means and mounted so as to alternately traverse the cloth and thereby be constrained by the binding threads.

2. The invention in accordance with claim 1, said prongs being disposed in the plane of action of said blade.

3. The invention in accordance with claim 1, the said prongs being supported by a plate and disposed in slightly overlapped relation.

4. In a loom of the type which utilizes spaced binding threads in the cloth being woven, a cutter comprising a blade, a support for said blade, means for reciprocating said blade, and a lateral guide for said blade comprising means connected to said reciprocating means and to said support for intermittently traversing the cloth to engage the binding threads.

5. The invention in accordance with claim 4, said guide comprising prongs disposed in the plane of the blade.

6. The invention in accordance with claim 4, said guide comprising oppositely disposed prongs, one prong being directed arcuately upward and the other arcuately downward and the ends thereof being slightly overlapped.

7. A cloth cutter for looms of the type which utilize spaced binding threads in the cloth being woven comprising a shears, means supporting said shears and constraining the shears to lie in a vertical plane while freely translatable in a transverse direction, means for actuating said shears, and guide means comprising oppositely disposed prongs connected to said actuating means and arranged to alternately pass through the cloth as the shears are actuated to guide the shears along a path between the binding threads.

8. A cloth cutter for looms of the type which utilize spaced binding threads in the cloth being woven comprising a shaft, means for actuating said shaft, a collar on said shaft free to slide along the shaft but constrained to rotate therewith, a shears, means including said collar for supporting said shear, means connected to said collar for actuating said shears, and a lateral guide for said collar and said shears comprising means connected to said actuating means for intermittently traversing the cloth to engage the binding threads.

9. The invention in accordance with claim 8, said guide comprising prongs disposed in the plane of the said shears.

10. The invention in accordance with claim 8, said guide comprising oppositely disposed prongs, one prong being directed arcuately upward and the other arcuately downward and the ends thereof being slightly overlapped.

11. A cloth cutter for a loom comprising a shaft, means for rotationally oscillating said shaft, a collar on said shaft constrained to rotate therewith but free to slide therealong, a body mounted upon said collar the body being constrained to lie in a fixed position in a vertical plane, the collar being free to rotate with respect to said body, shears fixed to a pivot on said body, pins on the actuating arms of said shears, a plate mounted on said collar for rotatation therewith, said plate incorporating skew grooves into which the pins are fitted for the actuation of said shears, and guide prongs mounted on said plate said prongs being in oppositely disposed slightly overlapped relationship and lying in the plane of said shears.



12. A cloth cutter for looms of the type which utilize spaced binding threads comprising a blade, means for supporting said blade for rotational actuation and free transverse motion, means for reciprocating said blade, and a guide for said blade comprising prongs mounted on the support means for alternately passing through the cloth to be cut in unison with the motion of the blade whereby the binding threads act upon the guide to constrain the motion of the blade to a path between the binding threads.

13. A cloth cutter for looms of the type which utilize spaced binding threads comprising a shaft, a support member mounted on said shaft and freely slidable therealong, a blade mounted on said support member, and a lateral guide for said support comprising means mounted on said support means for intermittently traversing the cloth to engage the binding threads.

14. A cloth cutter for looms of the type which utilize spaced binding threads comprising a shaft, a support member mounted on said shaft and freely slidable therealong, a blade mounted on said support member, and a lateral guide for said support comprising prongs disposed in the plane of said blade and forward thereof, one prong being directed arcuately upward and the other arcuately downward whereby the passage of the prongs between the weft threads to contact the binding threads as the blade is actuated serves to position the blade along the shaft.

15. A cloth cutter for a loom comprising a shaft means for rotationally oscillating said shaft, a collar on said shaft constrained to rotate therewith but free to slide therealong, a body part mounted on said collar, a blade supported by said body and guide prongs mounted on said body and disposed in the plane of said blade, the ends of the prongs lying in an overlapped relationship along a line parallel to the edge of said blade and spaced in a direction normal thereto, whereby the said prongs serve to position the said collar and said blade along said shaft.

16. A cloth cutter for looms of the type which utilize spaced binding threads comprising a shaft, a support member mounted on said shaft and freely slidable therealong, a blade mounted on said support member, and a lateral guide for said support comprising means mounted on said support means forwardly of said blade for intermittently traversing the cloth to engage the binding threads.

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## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 436,018 | Lacey | Sept. 9, 1890 |
| 1,835,556 | Brown | Dec. 8, 1931 |
| 2,530,134 | Taylor et al. | Nov. 14, 1950 |
| 2,533,996 | Clarkson | Dec. 12, 1950 |