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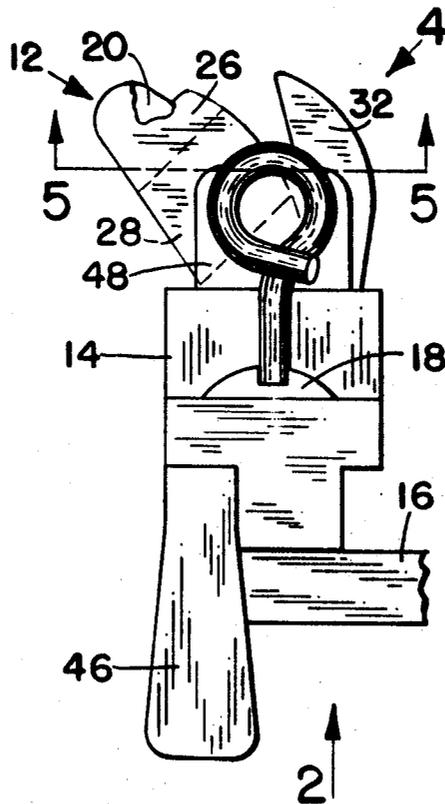
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	UNITED STATES PATENTS		
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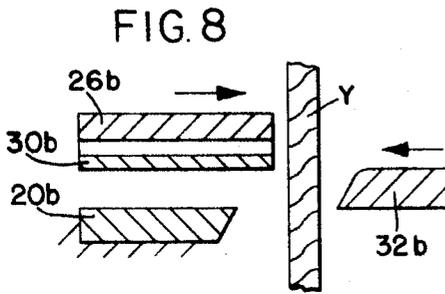
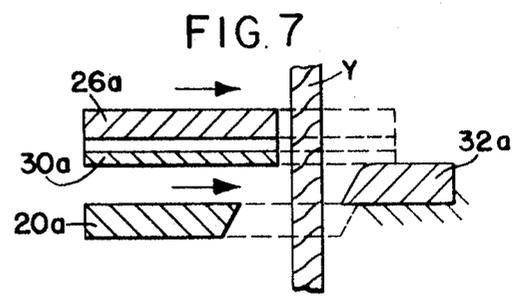
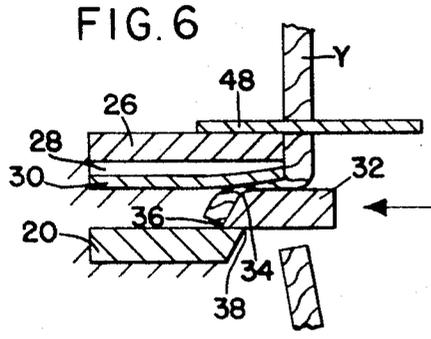
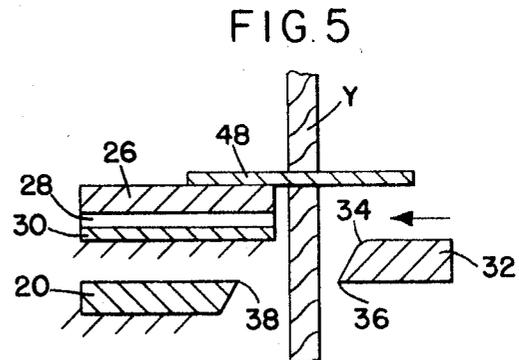
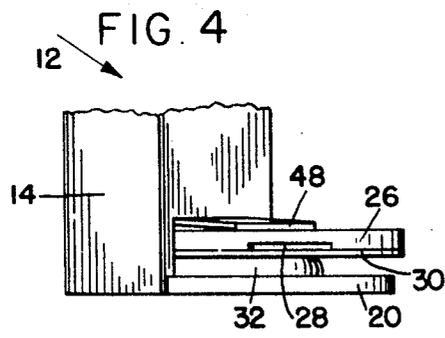
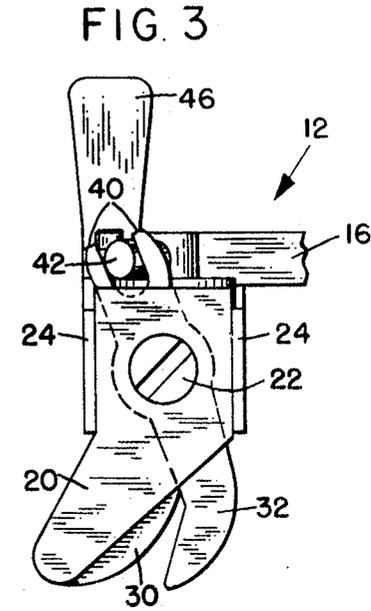
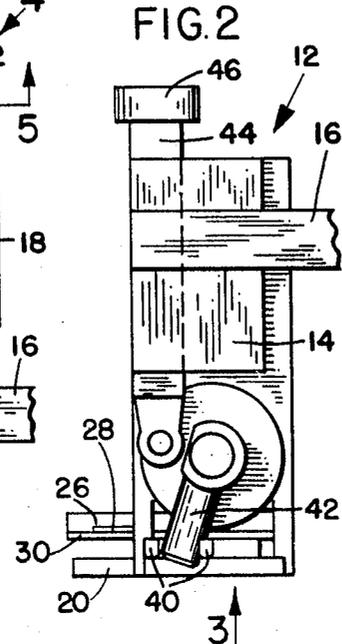
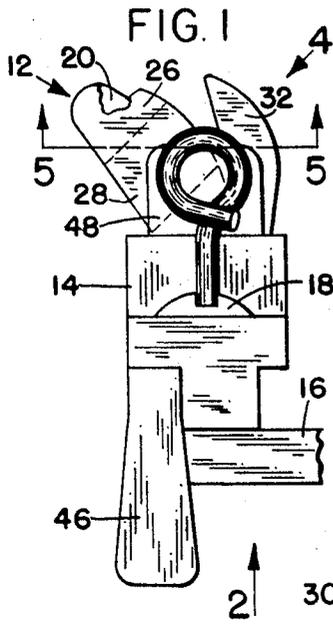
Primary Examiner—Henry S. Jaudon
Attorney—Howard G. Garner, Jr.

[54] **YARN CLAMPING AND CUTTING DEVICE**
 7 Claims, 11 Drawing Figs.

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 66/145
 [51] Int. Cl. **D03d 47/36,**
 D03d 45/50
 [50] Field of Search **66/145,**
 132; 26/10.4; 139/121, 125, 126, 263, 268, 170.4

ABSTRACT: A yarn clamping and cutting device in which a flat resilient clamping blade abuts a clamping support blade and extends across a groove in the support blade. A combination blade has a cutting edge for cooperating with a cutting blade and a clamping edge for cooperating with the flat clamping blade to clamp a yarn at a point on the clamping blade which extends across the groove.





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FIG. 9

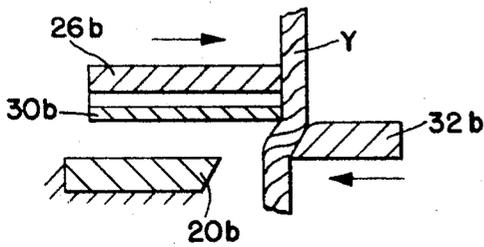


FIG. 10

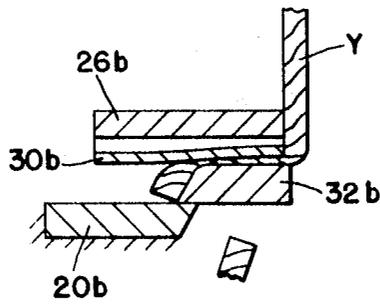
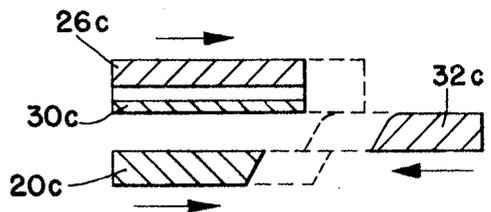


FIG. 11



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YARN CLAMPING AND CUTTING DEVICE

BACKGROUND OF THE INVENTION

This invention relates to a device for clamping and cutting a textile yarn and is particularly useful in weaving looms of the gripper shuttle-type operating with an outside filling supply source. U.S. Pat. No. 3,376,900, issued Apr. 9, 1968 in the name of Oscar V. Payne, illustrates an area in which the clamping and cutting device of the present invention can be applied.

In most textile machines such as in a loom where it is necessary to cut a yarn, the end of the yarn leading back to the supply source must be retained so that there is always some control of the yarn. In looms of the outside filling supply type, the yarn is cut and clamped and the clamped end transferred to a clamp within the shuttle. At another point in the weaving cycle, the yarn is retrieved from the shuttle by the same mechanism which did the original cutting and clamping. It is important that the end of the yarn be retained at all times by either the clamping and cutting device or the shuttle to insure continuous operation of the machine.

Many clamping and cutting devices have been designed to specifically insure that the yarn is consistently cut and clamped. The more common type of device includes a cutting blade, a clamping blade, and an intermediate combination blade which is moved relative to the first two blades. The combination blade has a cutting edge for cooperating with the cutting blade and a clamping edge for cooperating with the clamping blade. In many instances, considerable pressure has to be placed on the blades to insure reliable cutting. Pressure can be increased by mounting the blades in a tight-fitting relationship or by mounting a spring so that the blades are urged together. A drawback to this approach which has been encountered is that an increase of pressure frequently causes the clamping edges of the clamping and combination blades to cut the yarn. The phenomenon is generally referred to as "double cutting."

One attempt to solve the problem of "double cutting" was to make the clamping blade relatively resilient with respect to the other blades to relieve the clamping pressure. Examples of this approach to the problem are shown in U.S. Pat. Nos. 2,928,428 and 2,971,540 issued Mar. 15, 1960 and Feb. 14, 1961, respectively, in the name of G. W. Dunham.

Use of a resilient clamping blade prevents "double cutting" but has a drawback in that it is unreliable for yarn clamping. There is a lack of uniformity of clamping pressure along the clamping blade due to the cantilever effect of the blade. Clamping of the yarn takes place over a relatively small range of the clamping blade but the range is large enough so that a yarn clamped toward the free end of the blade will be under considerably less pressure than a yarn clamped toward the fixed end of the blade. In addition, the yarn is likely to be pulled out of the clamp since any tug of the yarn toward the free end of the clamp will be in the direction of decreasing clamping pressure.

SUMMARY OF THE INVENTION

A principal object of the invention is to provide a clamping and cutting device which clamps and cuts a yarn with a high degree of consistency without "double cutting."

The principal object of this invention is accomplished by providing a clamping and cutting device which has a flat spring type or resilient clamping blade which abuts one side of a clamping support blade. The clamping support blade has a groove in the abutting side which is spanned by the resilient clamping blade. The device also has a combination blade which has a clamping edge for cooperating with the clamping blade and a cutting edge for cooperating with a cutting blade. The groove is positioned to coincide with the area or section of the clamping blade where yarn clamping occurs. The groove is large enough to cover the entire range of points along the clamping blade at which the yarn is normally clamped.

An advantage of the present device is that the clamping pressure on the yarn will be consistent since the yarn will always be clamped opposite the groove. The clamping blade is supported by both sides of the groove so that there is no cantilever effect.

Another advantage is that the blades can be mounted in a very tight cooperating relationship to insure for consistent cutting of the yarn and yet not effect the clamping pressure. The clamping blade will be deflected into the groove of the clamping support blade by the yarn to the same degree regardless of how much pressure is put on the blades.

A spring may be utilized to apply a desired degree of pressure on the blades to urge them together. The strength of the spring selected can be varied to suit the particular cutting requirements for a particular type or size of yarn. For any particular application, the clamping blade will have characteristics which create the proper clamping pressure for a particular type of yarn. The clamping and cutting pressures of the present device therefore are independent to the extent that one cannot influence the other. The cutting and clamping settings can be respective optimums without concern as to whether one will have any effect on the other.

BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages of the invention will become apparent from a reading of the following description together with the accompanying drawings in which:

FIG. 1 is a plan view of the novel clamping and cutting device of the present invention;

FIG. 2 is a front elevation thereof;

FIG. 3 is a bottom plan view looking in the direction of arrow 3 in FIG. 2;

FIG. 4 is a fragmentary view of the stack of blades looking in the direction of arrow 4 in FIG. 1 and on an enlarged scale;

FIG. 5 is an enlarged longitudinal section on line 4-4 in FIG. 1 showing the blades in the open or yarn-receiving position with a yarn in position to be clamped and cut;

FIG. 6 is a view similar to FIG. 5 and showing the blades in yarn clamping and cutting position;

FIG. 7 is a view similar to FIG. 5 but showing a modification in blade movement;

FIGS. 8, 9, and 10 are similar to FIGS. 5 and 6 and illustrate a second modified blade movement; and

FIG. 11 is a view similar to FIG. 5 and showing a third modified blade movement.

DETAILED DESCRIPTION

Referring to FIGS. 1-4, the clamping and cutting device of the present invention is generally indicated by the reference character 12 and includes a body 14 which is adapted to be mounted to a support 16 as by a screw 18. Support 16 may be part of the machine to which the invention is applied.

A cutting blade 20 is mounted on the lower end of body 14 by a screw 22. Blade 20 is restrained from moving relative to the body by depending ears 24. A clamping support blade 26 is mounted in body 14 and spaced above blade 20 in general alignment therewith. Blade 26 has a groove 28 extending across the width of the blade in the side-facing blade 20. A flat resilient clamping blade 30 is mounted in body 14 in alignment with blade 26 and abutting the grooved side of blade 26. Blade 30 extends across the width of groove 28 as shown in FIG. 4. Blades 28 and 30 are also secured in body 14 against movement relative thereto.

A combination blade 32 is pivotally mounted on screw 22 and is located between blades 20 and 30. Blade 32 has clamping surface 34 for cooperating with clamping blade 30 and a cutting edge 36 for cooperating with a cutting edge 38 of blade 20. Blade 32 is narrow enough, as indicated by dotted lines in FIG. 3, so that it can be pivoted between depending portions 24 of body 14. Blade 32 also has a bifurcated end portion 40 which extends beyond the forward limits of depending portions 24. Portion 40 is engaged by a pivoted lever 42. A plunger 44 is slidably mounted in body 14 and is

pivotaly attached at its lower end to lever 42. The upper end of lever 44 has an extending arm 46 designed to be engaged by a mechanism which is part of the machine to which the present invention is applied. Upward motion of lever 46 will cause lever 42 to pivot blade 32 to the yarn-receiving position to form a V-shaped opening with respect to blades 20, 26, and 30 as shown in FIGS. 1 and 3. Downward motion of plunger 44 will cause lever 42 to pivot blade 32 to the yarn clamping and cutting position as indicated in FIG. 6.

A flat spring 48 is mounted in body 14 just above blade 26 for urging blades 26, 30, and 32 against cutting blade 20 to maintain all of the blades in tight alignment.

Referring to FIG. 5, blade 32 is shown in its yarn receiving position and a yarn Y is located in the V-shaped opening between blade 32 and the other blades. Blades 20, 26, and 30 remain stationary and blade 32 is moved toward these blades as described. As blade 32 moves between blades 30 and 20, surface 34 clamps the yarn against the lower surface of blade 30 and edge 36 cooperates with edge 38 of blade 20 to cut the yarn as indicated in FIG. 6. This Figure also illustrates how the yarn is compressed between blades 30 and 32 and how blade 30 is deflected slightly within groove 28.

The description thus far illustrates one manner in which relative motion of the blades can be achieved to accomplish yarn clamping and cutting.

FIG. 7 shows a modification wherein the combination blade, indicated at 32a, is fixed and remaining blades 20a, 26a, and 30a are mounted in body 14 for pivoted movement. Blades 20a, 26a, 30a, and 32a are exactly like blades 20, 26, 30, and 32, respectively, except for the way in which they are mounted in body 14. Blades 20a, 26a, and 30a would, of course, have bifurcated ends such as 40 for blade 32 to be operated by lever 42, while blade 32a would not have a bifurcated end to be so engaged. The relative motion of the blades as shown in FIG. 7 would be the same as in the first described embodiment so that the blades would assume the dotted line position, as shown in FIG. 7, to clamp and cut a yarn exactly as illustrated in FIG. 6.

FIGS. 8-10 show a second modified blade movement in which a cutting blade 20b is fixed and the remaining blades 26b, 30b, and 32b are pivotaly mounted in body 14. Blades 20b, 26b, 30b and 32b are like blades 20, 26, 30 and 32 except for the manner in which they are mounted in body 14 and how they receive their relative motion. In this embodiment, blades 26b and 30b move toward blade 32 while blade 32b moves toward blade 20b and blades 26b and 30b to first clamp the yarn Y as shown in FIG. 9. At this point, blade 26b and 30b stop, and blade 32b continues to move toward blade 20b to cut the yarn as shown in FIG. 10. The linkage required to accomplish the motion illustrated in FIGS. 8-10 are shown in assignee's U.S. copending application Ser. No. 782,542, filed Dec. 10, 1968 now U.S. Pat. Ser. No. 3,513,883 in the name of Charles R. Kingdon.

FIG. 11 illustrates a third modified blade movement in which all of the blades are pivotaly mounted in body 14.

Blades 20c, 26c, 30c and 32c are like blades 20, 26, 30, and 32, respectively, except for the way in which they are mounted in body 14 and the manner in which they are moved relative to each other. The blades in FIG. 11 move between an open or yarn-receiving position, as shown in that Figure, to a clamping and cutting position exactly as shown in FIG. 10. Blades 20c, 26c, and 30c are moved toward 32c while blade 32c is moved toward blades 20c, 26c, and 30c. U.S. Pat. No. 3,376,900 to Payne illustrates one means of moving all of the blades concurrently.

Having particularly described the invention, what I now claim is:

1. A yarn clamping and cutting device comprising:

- a. a body adapted to be secured to a support;
- b. a cutting blade mounted on one end of said body;
- c. a clamping support blade mounted on said body at point spaced from said cutting blade and having a groove on the side facing said cutting blade.
- d. a resilient clamping blade mounted in abutting relationship along the grooved side of said clamping support and extending across said groove;
- e. a combination blade mounted on said body and interposed between said cutting blade and said clamping blade, having a cutting edge for cooperating with said cutting blade and a clamping edge for cooperating with said clamping blade for clamping a yarn at the point on said clamping blade which extends across said groove, said blades being mounted for relative motion between said combination blade and the others of said blades, said motion being between a yarn-receiving position and a yarn clamping and cutting position; and
- f. operating means mounted on said body and operably connected to at least one of said blades for producing said relative motion.

2. The clamping and cutting device as described in claim 1 wherein said device further comprises a spring mounted on said body for forcing said blades into tight cooperative alignment.

3. The clamping and cutting device as described in claim 2 wherein said spring is a flat leaf spring fixed at one end to said body and bearing against said clamping support blade in a direction towards said cutting blade.

4. The clamping and cutting device as described in claim 1 wherein said cutting, clamping support and clamping blades are fixed to said body and said combination blade is pivotaly mounted on said body.

5. The clamping and cutting device as described in claim 1 wherein said combination blade is fixed to said body and said cutting, clamping support and clamping blades are pivotaly mounted on said body.

6. The clamping and cutting device as described in claim 1 wherein all of said blades are pivotaly mounted on said body.

7. The clamping and cutting device as described in claim 1 wherein said cutting blade is fixed to said body and the others of said blades are pivotaly mounted on said body.