APPARATUS FOR FORMING A STRONG SELVAGE IN A FABRIC

Inventors: Walther Filter, Langenhagen; Claus Filter, Retheim, Aller, both of Germany

Assignees: Vereinigte Österreichische Eisen-und Stahlwerke, Vienna, Austria; Alpine Montan Akteingesellschaft & Etablissement Wanderfield & Co., Schaan, Liechtenstein

Filed: June 3, 1974
Appl. No.: 475,500

FOREIGN PATENTS OR APPLICATIONS
439,158 12/1967 Switzerland 139/291 C
625,921 8/1961 Canada 139/291 C
857,664 12/1970 Canada 139/291 R

OTHER PUBLICATIONS
1,013,585, 08 08 1957, German application (Rossler), 139–291 C.

Primary Examiner—James Kee Chi
Attorney, Agent, or Firm—Kurt Kelman

ABSTRACT
The selvage is to be formed in a longitudinal edge portion which contains fusible warp threads and from which filling thread end portions protrude. The apparatus comprises a carrier and a heating device mounted on said carrier and comprising two relatively movable jaws cyclically operable to close against and open from said edge portion. The jaws are heatable to melt said fusible threads when said jaws are closed against said edge portion. The apparatus further comprises shears mounted on said carrier and cyclically operable to close against and open from said protruding filling thread end portions so as to cut off the latter, and drive means for cyclically operating said jaws and shears to open and close in phase opposition to each other.

5 Claims, 1 Drawing Figure
APPROATUS FOR FORMING A STRONG SELVAGE IN A FABRIC

This invention relates to an apparatus for forming a strong selvage, comprising a heating device for heating fusible warp threads provided in the edge portion of the fabric and shears for thereafter cutting the filling thread end portions which protrude from the selvage.

It is already known to provide fusible warp threads in the edge portion of a woven fabric in order to enable the formation of a strong selvage. By a heating device which is laterally disposed on the weaving machine, these fusible threads are heated beyond their melting point so that they melt and bond the fabric portion in which they are disposed. The filling thread end portions which protrude from the resulting selvage must subsequently be cut off by shears so that a neat and straight selvage is obtained. This method of forming strong selvages has proved satisfactory but involves the risk that the heat supplied to melt the fusible threads may adversely affect the woven fabric, particularly during a standstill of the machine. Besides, an adaptation to woven fabrics differing in width is difficult because the heating device and the shears for cutting off the protruding filling thread end portions would have to be correspondingly adjusted for this purpose. This has been enabled by special brackets, which protrude into the weaving region.

To avoid these disadvantages it has already been proposed to replace the heating devices by ultrasonic generators and to weld the synthetic material in the edge portion under the action of the ultrasonic energy which is supplied. For a division of the woven fabric into strips along lines which are parallel to the warp, a knife is provided, which is connected to the ultrasonic generator and vibrated in phase with the latter. A web of synthetic wadding is applied to the fabric adjacent to the line of division and is welded at the same time at which the fabric is cut. That known apparatus has the disadvantage that it involves a relatively high structural expenditure and that economically satisfactory ultrasonic generators can supply only a small low sound energy.

It is an object of the invention to provide an efficient apparatus which is simple in structure and serves to form a strong selvage by means of one or more fusible threads and avoids damage to the fabric by the heating device also during a standstill of the weaving machine and enables a simple adaptation to woven fabrics differing in width.

In an apparatus of the kind described first hereinbefore, this object is accomplished by the invention in that the heating device consisting of two relatively movable jaws as well as the shears are mounted in a manner known per se on a common carrier, which is adapted to be secured preferably to the front rest, and that the shears are opened and closed as the jaws are closed and opened in phase opposition thereto. Because the heating device and the shears are mounted on a carrier which is adapted to be secured to the front rest, e.g., by clamping, the apparatus can be mounted at any desired point along the front rest so that it is possible to provide selvages on woven fabrics differing in width and to form also selvages along edges formed as the woven fabric is cut in the longitudinal direction. For this purpose it is sufficient to provide shears and a heating device on each side of the carrier and to provide additional shears, which are associated with these devices and serve to cut through the woven fabric in its longitudinal direction. The shears for cutting off the protruding filling thread end portions are suitably arranged to include an acute angle with each other so that the direction of cut is parallel to the fabric edge as it is distorted.

Because the opening and closing motions of the shears and of the jaws of the heating device are coupled in accordance with the invention, the heating device cannot damage the woven fabric even when the weaving machine is at a standstill and one and the same portion of the woven fabric remains within the range of the heating device. When the shears close for a cut, the jaws of the heating device are opened so that an over-heating of and damage to the woven fabric are precluded as the woven fabric can sufficiently cool down while the jaws are open. During a standstill of the weaving machine, care must obviously be taken to continue the operation of the cyclic drive means for the apparatus for forming the selvage or to permit of a deenergization of said drive means only when the jaws of the heating device are open if the heating device is not to be deenergized.

An embodiment of the invention is shown by way of example on the accompanying diagrammatic drawing, which is a sectional view showing an apparatus according to the invention for forming a strong selvage.

The front rest of a flat weaving machine comprises a flange 1 for sequentially guiding a woven fabric 2 through a heating station and a cutting station. A carrier 3 is clamped by clamping screws 4 to the front rest and carries the heating including two jaws 5, 6, and the cutting station including shears 7. The jaw 5 is fixed to the carrier. The jaw 6 is disposed opposite to the jaw 5 and is screw-connected to a rocker 8, which is pivoted to the carrier on a pin 9.

The carrier 3 has a frameline support 10, which is provided with a bracket 11, to which an arm 13 is pivoted by a pin 12. A tension spring 14 is connected to the support 10 and to the free end of the arm 13 and holds the latter in a predetermined pivotal position. That jaw 6 of the heating device which is connected to the rocker 8 bears on the arm 13 by means of a toggle joint 15, which has a central hinge 16. A push rod 18 is connected to a central hinge 16 of the toggle joint 15 and to a solenoid 17. The latter is carried by a U-shaped holder 19, which is connected by a hinge 20 to the rocker 8 and which carries a housing 21 and an indicating lamp 22.

A bell-crank lever 24 is pivoted to the support 10 by a pin 23 and has a forked end, which embraces a coupling pin 25 of the push rod 18. At its other end, the bell-crank lever is pivoted to a link 26, which is connected to the movable shear blade 27.

When the solenoid 17 extends the push rod 18 toward the central hinge 16, the toggle joint 15 is extended and the rocker 8 is pivotally moved from pivot pin 9. As a result, the heating jaw 6 is moved toward the fixed jaw 5 and the woven fabric 2 is forced against the jaw 5 whereas the woven fabric was held in a path out of contact with the retracted jaws by the flange 1 and a support 36. The woven fabric is thus heated from both sides. During the movement of the push rod 18, the coupling pin 25 imparts a pivotal movement to the bell-crank lever 24 so that the link 26 rotates the movable shear blade 27 in an opening sense about its pivot pin 28 provided in the carrier 3. During
the subsequent return movement of the push rod 18, the shears 7 are closed and the pair of heating jaws 5, 6 are opened. The shears and the heating device thus open and close in phase opposition so that even during a standstill of the weaving machine the woven fabric is heated intermittently rather than continuously and damage to the woven fabric by an excessively high temperature will be precluded if a proper cycle time is selected.

To enable an adjustment of the width of the gap between the closed jaws 5 and 6 in dependence on the nature of the woven fabric, a compression spring 29 is provided, which is disposed between the support 10 and the arm 13 and the initial tension of which can be varied by means of a set screw 30. The compression spring 29 opposes the tension spring 14 and biases the arm 13, which is loaded by the jaw 6. For this reason, the width of the gap between the jaws 5 and 6 can be adjusted by a change of the spring bias on the arm 13.

The resilient cushioning of the arm 13 also precludes damage to the woven fabric and to the actuating device when the jaws are closed against a fabric which has a thickness that is larger than the width of the gap remaining between the jaws. In such case, the jaw 6 will not descend further but the arm 13 will be raised because it is resiliently supported.

A temperature sensor 31 in the heating circuit of the jaws 5, 6, not otherwise shown, is provided to sense and control the temperature of the heating jaws so that the desired heating temperature can be maintained in a simple manner.

To enable a further adaptation, the carrier 3 is provided with two clamping members 32 and 33, which enable a clamping of the carrier 3 on the guide flange 1 in a selected position.

The drawing includes a diagrammatic representation of an intermittently rotating reed, which comprises a multiplicity of discs 34, which are provided with thread-engaging noses 35 and are threaded on a common shaft. The noses 35 beat up each filling thread against the fell. To ensure that the thread-engaging noses 35 can be moved below the support 36 for the woven fabric when the filling thread has been beaten up, the support 36 is pivoted on an axle 37, which is parallel to the fell, and is swung up by means of tappets 38 whenever a filling thread has been beaten up.

What is claimed is:

1. An apparatus for forming a strong selvage in an edge portion of a woven fabric, said edge portion including fusible warp threads and filling threads having end portions freely projecting from said warp threads, said apparatus comprising:

   a. guide means for guiding movement of said edge portion in a predetermined path through a heating station and thereafter through a cutting station;
   b. a carrier;
   c. two jaws mounted on said carrier at said cutting station on opposite sides of said path for movement between a retracted position in which each jaw is remote from the other jaw and from said path, and an operative position nearer said edge portion and said other jaw than said retracted position;
   d. means for heating said jaws;
   e. two shears mounted on said carrier at said cutting station for movement between an open position and a closed position, said shears when moving from the open to the closed position cutting said projecting end portions from an edge portion guided in said path; and
   f. drive means for cyclically moving said jaws from said retracted position to said operative position while simultaneously moving said shears from the closed to the open position, and for thereafter moving said jaws from said operating position to said retracted position while simultaneously moving said shears from the open position to the closed position.

2. An apparatus as set forth in claim 1, wherein said drive means include a rocker pivotally mounted on said carrier, a toggle joint interposed between said rocker and said support and having a central hinge, a reciprocable linear motor pivotally mounted on said rocker and connected to said central hinge, one of said jaws being fixedly mounted on said carrier, the other jaw being mounted on said rocker.

3. An apparatus as set forth in claim 2, in which said motor is a solenoid.

4. An apparatus as set forth in claim 2, in which an arm is pivoted to said support and extends transversely to the direction in which said other jaw moves with said rocker, said toggle joint is connected between said rocker and said arm, and said arm has a free end, which is connected by a spring to said support.

5. An apparatus as set forth in claim 4, in which said spring tends to move said free end of said arm toward said support, and an additional spring is interposed between said arm and said support and tends to move said free end of said arm away from said support, and one of said springs is adjustable to vary its initial stress.