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WORK GUIDING DEVICES FOR SEWING MACHINES

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This invention relates to work fabric guiding devices for sewing machines, and more particularly to a work guide automatically effective to maintain the edge of a work fabric panel positioned along a predetermined linear path during a sewing operation.

This invention utilizes a work guiding device in which the influence of a stream or streams of compressed air serves to position the work fabric panel as the panel is directed to the stitching point.

It is an object of this invention to provide a work guiding device utilizing compressed air to position a work fabric therein and which is constructed and arranged in a novel and effective fashion automatically to regulate the flow of compressed air in response to the position of the work fabric in the guiding device so as to maintain the edge of the work fabric positioned along a predetermined linear path.

Another object of this invention is to provide an automatic work fabric positioning guide of the above character in which the only moving element is the work fabric being influenced by the work guide.

With the above and additional objects and advantages in view as will hereinafter appear this invention will now be described with reference to the accompanying drawings in which:

FIG. 1 represents a top plan view of a work guiding device in accordance with this invention applied to the work supporting bed of a sewing machine,

FIG. 2 is a cross sectional view of the work guiding device of FIG. 1 taken substantially along line 2—2 of FIG. 1, including a representation of a work fabric panel of which an edge is positioned contiguous to an edge guiding surface of the work guiding device,

FIG. 3 represents a front elevational view of the work guiding device of FIG. 1 with the work supporting bed of the sewing machine in section and including a representation of a work fabric panel of which the edge has moved away from an edge guiding surface of the work guiding device, and

FIG. 4 represents a perspective view of the work guiding device of this invention.

Referring to FIG. 1, 11 indicates the work supporting bed of a conventional sewing machine. Indicated at 12 is a conventional sewing machine presser foot which during a machine sewing operation presses a work fabric 13 onto a throat plate 14 set flush with the sewing machine work supporting bed. A line of stitches 15 is illustrated as formed in the work fabric 13 and the path of endwise reciprocation of the sewing machine needle is indicated at 16 in FIG. 1, which needle path defines the stitching point. The direction which the line of stitches 15 proceeds from the stitching point is determined in machine sewing by the action of the sewing machine work feeding mechanism. The work feeding mechanism is not illustrated in the accompanying drawings since any conventional sewing machine work feed may be employed.

In order to produce a line of stitches 15 parallel to an edge 17 of the work fabric it is necessary that the work fabric 13 be guided in its movement toward the stitching point with the edge 17 maintained in a predetermined linear path, such as X—X illustrated in FIG. 1, which path is parallel to the line of stitches 15.

To facilitate such guiding of the work fabric it is con-

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ventional in the sewing machine art to provide a work guide such as is indicated generally at 20 in the drawings and comprising a pair of spaced plates 21, 22, preferably sheet metal, defining therebetween a fabric accommodating channel 23. Extending normal to the plates 21 and 22 and provided, either by a separately attached element or, as illustrated in the drawings, by an upturned portion 24 of one of the plates 22, is a fabric edge guiding surface 25. The upturned portion 24 also provides a flange to which is attached a bracket 26 formed with an elongate slot 27 accommodating a fastening screw 28 by which the work guide may be secured to the sewing machine work supporting bed 11 with the edge guiding surface 25 aligned with the desired linear path X—X for the edge of the work fabrics.

The work guide 20, as thus far described, is conventional and when used requires constant operator manipulation of the work fabric to maintain the fabric edge 17 contiguous to the edge guiding surface 25 of the guide in order to insure that the stitching 15 will be made parallel to the edge of the work, as illustrated in FIG. 1.

In this invention, provision is made for the control of the position of a work fabric within the work fabric accommodating channel 23 of the work guide by means of a directed stream or streams of compressed air. A plurality of air nozzles 30, 31, which shall be termed herein first air nozzles extend through and are affixed to the plate 21 of the guide 20 preferably by welding or brazing. Each of the first air nozzles 30, 31 is inclined so as to direct a stream of air into the channel and toward the work edge guiding surface 25 of the guide and toward the predetermined linear path X—X defined thereby. The first air nozzles 30, 31 may also be inclined slightly toward the stitching point on the sewing machines. One of the first air nozzles 30 is connected by a hose 32 to a pipe 33 which extends through the bottom plate 23 of the guide 20 and is affixed thereto preferably by welding or brazing. The pipe 33 is provided with a mouth 34 opening into the work fabric accommodating channel 23 contiguous to the work edge guiding surface 25 of the guide. The pipe 33 and hose 32 together define a conduit leading to the first air nozzle 30.

Extending through the top plate 21 of the guide and secured thereto, preferably as by welding or brazing, is a second air nozzle 35. The second air nozzle 35 is arranged substantially parallel to the work edge guiding surface 25 and preferably normal to the plates 21, 22 of the guide 20 and is aligned with the mouth 34 of the pipe 33 but spaced therefrom at the opposite side of the work accommodating channel.

A third air nozzle 36 extends through and is affixed to the top plate 21 of the guide 20, preferably as by welding or brazing, and is inclined so as to direct a stream of air into the work fabric accommodating channel and away from the edge guiding surface 25 and thus away from the predetermined linear path X—X.

A hose 37 serves to connect the first air nozzle 31 to a source of air under pressure (not shown). The second air nozzle 35 is connected by a hose 38 to one branch of a T pipe fitting 39. A hose 40 connects the third air nozzle 36 to another branch of the pipe fitting 39 and a hose 41 connects the third branch of the pipe fitting 39 to a source of air under pressure (not shown).

The operation of the work guiding device of this invention may be best understood by initially referring to FIG. 3 which illustrates the conditions which occur when a work fabric edge is not properly oriented contiguous to the work edge guiding surface 25 and along the predetermined linear path X—X. Under these conditions air under pressure delivered through hoses 41 and 38 to the second air nozzle 35 will pass across the work accommo-

dating channel 23 of the guide and, in the absence of work fabric therebetween, will enter the mouth 34 of the pipe 33 and be directed through the hose 32 and to the first air nozzle 30. The action of the first air nozzle 30 is to direct a stream of air toward the work edge guiding surface 25 thus to urge the edge 17 of a work fabric into a position against the edge guiding surface 25.

Referring to FIG. 2 the conditions may be explained which occur when the edge 17 of a work fabric has been shifted into contiguous relation with the edge guiding surface 25 of the guide. In this condition the work fabric 13 will be interposed between the second air nozzle 35 and the mouth 34 of the conduit leading to the first air nozzle 30 thus interrupting the supply of air under pressure to the first air nozzle 30 and suspending the action of the nozzle 30 in urging the work fabric edge 17 toward the edge guiding surface 25.

In instances in which this invention is employed using a work guide having a tangible work edge guiding surface 25, the air nozzles 30 and 35 arranged and interrelated as above described can be sufficient to provide an adequate automatic control of the position of work fabric in the guide 20. The tangible work edge guiding surface 25 provides deterrent for excessive movement of the work fabric toward the work edge guiding surface and any movement of the work edge 17 away from the surface 25 is counteracted by the air nozzle 30 as soon as the space between the air nozzle 35 and the conduit mouth 34 is vacated by the work fabric.

A greater nicety of work control, however, is provided by the arrangement of air nozzles 30, 31, 34 and 36 as described above to the extent that the work guide device can be operative in the absence of a tangible work edge guiding surface 25.

Since the air nozzles 35 and 36 are supplied with compressed air by way of a common hose 41 from a supply of air under pressure, the amount of compressed air supplied to the air nozzle 36 will be increased slightly when work fabrics block the air nozzle 35. A slight increase will therefore occur in the effect of the air nozzle 36 in retracting a work fabric edge 17 from the predetermined linear path X—X. Thus, the combined effect of action of the air nozzle 30 when the fabric edge 17 moves to the left, as viewed in FIG. 3, and the action of the air nozzle 36 when the fabric edge moves to the right, as viewed in FIG. 2, cooperate to control the position of the work fabric in the work accommodating channel 23 with the work edge 17 maintained in the predetermined linear path.

Having set forth the nature of this invention, what is claimed herein is:

1. A device for guiding work fabrics including a work fabric accommodating channel and a work edge guiding surface extending substantially normal to said work guiding channel, a first air nozzle associated with said work guiding device, said first air nozzle terminating in said work accommodating channel and inclined toward said work edge guiding surface, a second air nozzle associated with said work guiding device, said second air nozzle terminating at one side of said work accommodating channel substantially normal to said work accommodating channel and contiguous to said work guiding surface, a conduit connected to said first air nozzle and terminating in alignment with and at the opposite side of said work accommodating channel from said second air nozzle, and means for delivering air under pressure to said second air

nozzle whereby said air under pressure will be delivered from said second air nozzle to said first air nozzle when said work fabric is out of alignment with said work edge guiding surface.

2. A device for guiding the edge of a work fabric along a predetermined linear path comprising a work guiding device including a work fabric accommodating channel, a first air nozzle terminating within said work fabric accommodating channel and inclined toward said predetermined linear path, a second air nozzle terminating at one side of said work accommodating channel substantially normal to said work accommodating channel and contiguous to said predetermined linear path, a conduit connected to said first air nozzle and terminating in alignment with and at the opposite side of said work accommodating channel from said second air nozzle, a third air nozzle terminating within said work fabric accommodating channel and inclined away from said predetermined linear path, and means for delivering air under pressure to said second and third air nozzles.

3. A device for guiding the edge of a work fabric along a predetermined linear path comprising a work guiding device including a work fabric accommodating channel, a plurality of first air nozzles terminating within said work fabric accommodating channel and inclined toward said predetermined linear path, a second air nozzle terminating at one side of said work accommodating channel substantially normal to said work accommodating channel and contiguous to said predetermined linear path, a conduit connected to at least one of said first air nozzles, and terminating in alignment with and at the opposite side of said work accommodating channel from said second air nozzle, a third air nozzle terminating within said work fabric accommodating channel and inclined away from said predetermined linear path, and means for delivering air under pressure to those of said first air nozzles which are not connected to said conduit and to said second and third air nozzles.

4. A device for guiding work fabrics including a stationary work fabric accommodating surface, a work edge guiding surface provided along said work fabric accommodating surface, an air nozzle carried by said work guiding device, said air nozzle being inclined toward said work fabric accommodating surface and inclined at an acute angle toward said work edge guiding surface, means for delivering a supply of air under pressure to said air nozzle, said air delivery means including means responsive to the presence of work fabric contiguous to said work edge guiding surface in said work guiding device for interrupting the delivery of air under pressure to said air nozzle and responsive to the absence of work fabric contiguous to said work edge guiding surface for establishing delivery of air under pressure to said air nozzle.

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