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(54) **Device for positioning an item to be sewn, for sewing machines, particularly for sewing labels onto hosiery items in automatic labeling machines**

(57) A device for positioning an item to be sewn, for sewing machines, particularly for sewing labels onto hosiery items, in automatic labeling machines. The device comprises a slider (2) which can slide along a first actuation path (3) on a plane which is perpendicular to the working axis (4) of the needle of the sewing machine. The slider (2) is rigidly coupled to a flap (5) which can be placed in the needle work area below the item to be sewn. The slider (2) further supports, above the flap (5), a complementary flap (9) which can move

on command towards or away from the flap (5) in order to produce, in cooperation with the flap, the engagement or release of the item to be sewn. First actuation means (10) are provided which act on command on the slider (2) to move it in one direction or in the opposite direction along the first actuation path (3) in order to vary as required the region of the item that is affected by the stitches.

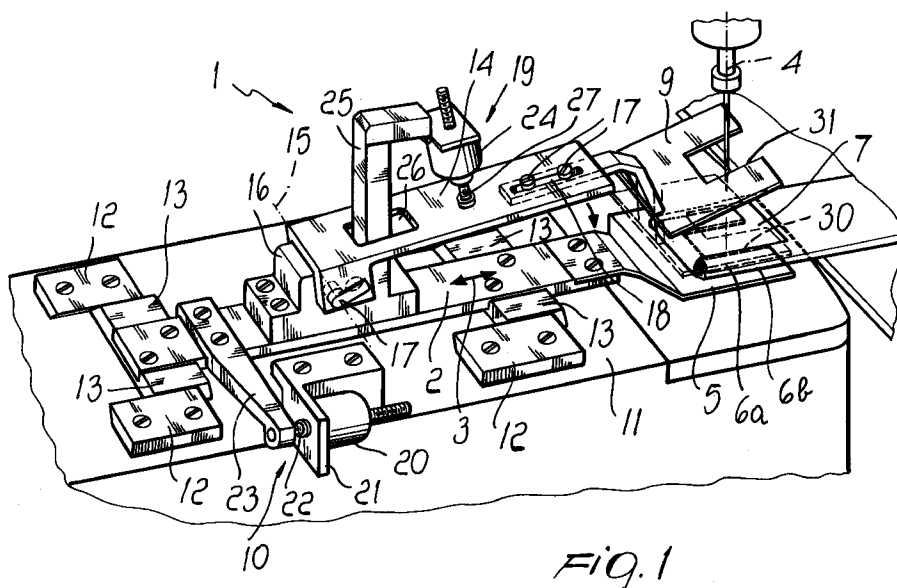


Fig. 1

EP 0 889 154 A2

Description

The present invention relates to a device for positioning an item to be sewn, for sewing machines, particularly for sewing labels onto hosiery items in automatic labeling machines.

Conventional automatic labeling machines are capable of sewing a label so that it straddles the top region of a pair of superimposed hosiery items.

A machine of this kind is disclosed, for example, in EPA 95119751.6 and is substantially constituted by a conveyor belt which can be actuated so that it performs a translatory motion along an advancement path which runs from a station for loading the hosiery items onto the conveyor belt to a station for unloading the labeled hosiery items. A station for positioning each time a label so that it straddles the top of a pair of mutually superimposed hosiery items and a station for sewing the label to the pair of hosiery items are provided sequentially along the path followed by the conveyor belt.

In the sewing station of this machine a sewing machine is mounted on a supporting plate which can move both longitudinally, in order to follow the advancement of the conveyor belt during sewing, and transversely to the travel path of the conveyor belt, so that its sewing head lies above the label which straddles the tops of the pair of hosiery items, which protrude laterally from the conveyor belt at the sewing station.

This sewing machine is constituted by a machine of the type usually used to apply buttons or to form button-holes in an item of clothing and has, below the sewing head, a plate which, by using the capability of the sewing machine to move transversely to the travel path of the conveyor belt, is moved below the region of the hosiery items that is covered by the label. Above said plate a presser shoe is provided which rests on the region of the hosiery item that is covered by the label and must be affected by the stitches. Both the shoe and the plate can be actuated, by means of a kinematic coupling to actuation elements of the sewing machine, on a plane which lies at right angles to the axis of the needle in order to produce, before sewing, a movement of the pair of hosiery items transversely to the travel path of the conveyor belt. Since this movement is produced by using kinematic connections which belong to the sewing machine, the extent of this movement is very modest and in many cases is unable to fully meet the positioning requirements of the stitches with respect to the label and to the pair of hosiery items.

Moreover, if the hosiery items are thick, or if the label has to be applied to the top so that the tip of the hosiery items is overlapped, it is rather difficult to achieve correct positioning of the top of the hosiery items with the label between the plate and the presser shoe.

The aim of the present invention is to solve the above problems by providing a device for positioning the item to be sewn for sewing machines, particularly for

sewing labels onto hosiery items in automatic labeling machines, which is capable of ensuring correct positioning of the item to be sewn with respect to the needle that performs sewing regardless of whether the item to be sewn can perform a translatory motion through the action of the elements with which sewing machines are usually equipped.

Within the scope of this aim, an object of the present invention is to provide a device which allows to variably position the item to be sewn according to requirements with respect to the axis of the needle.

Another object of the present invention is to provide a positioning device which, according to requirements, can be installed in a fixed manner directly on a sewing machine or can be applied to existing sewing machines.

Another object of the present invention is to provide a positioning device which is highly reliable in operation and allows to sew without problems also items having a considerable thickness.

This aim, these objects and others which will become apparent hereinafter are achieved by a device for positioning the item to be sewn for sewing machines, particularly for sewing labels onto hosiery items, in automatic labeling machines, characterized in that it comprises a slider which can slide along a first actuation path on a plane which is substantially perpendicular to the working axis of the needle of the sewing machine, said slider being rigidly coupled to a flap which can be placed in the needle work area below the item to be sewn, said slider further supporting, above said flap, a complementary flap which can move on command towards or away from said flap in order to produce, in cooperation with said flap, the engagement or release of the item to be sewn, first actuation means being provided which act on command on said slider to move it in one direction or in the opposite direction along said first actuation path.

Further characteristics and advantages of the device according to the present invention will become apparent from the following detailed description of a preferred but not exclusive embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic perspective view of the device according to the invention; and

Figure 2 is a schematic perspective view of the base plate of the device according to the invention.

With reference to the above figures, the device according to the invention, generally designated by the reference numeral 1, comprises a slider 2 which is supported, so that it can slide along a first actuation path 3, on a plane which is substantially perpendicular to a working axis 4 of the needle of the sewing machine.

The slider 2 is rigidly coupled to a flap 5 which, as a consequence of the actuation of the slider 2 along the path 3, can be positioned in the needle work area of the

machine below the item to be sewn, which is constituted, in the drawings, by a pair of hosiery items 6a and 6b on which a label 7 to be sewn is superimposed in the top region. The slider 2 further supports, above the flap 5, a complementary flap 9 which can move on command towards or away from the flap 5 to engage or release, in cooperation with said flap 5, the item to be sewn.

The device comprises first actuation means, generally designated by the reference numeral 10, which act on command on the slider 2 to produce its translatable motion in one direction or the other along the first actuation path 3.

More particularly, the slider 2 is supported by a base plate 11 which lies on a substantially horizontal plane, i.e., at right angles to the axis 4 of the needle. Two pairs of flat strips 12 are applied to the base plate 11 and form a dovetail guide for two portions 13 of the slider 2.

The complementary flap 9 is mounted at the end of an arm 14 which is pivoted, at its other end and about an axis 15 which is substantially perpendicular to the first actuation path 3, to a block 16 which is rigidly coupled to the slider 2.

The arm 14 is pivoted to the block 16 by means of a removable pivot 17; it is possible to provide, on the block 16, a plurality of pivoting holes for the insertion of the pivot 17 which are mutually spaced parallel to the first actuation path 3 so as to allow to adjust the position of the arm 14 and therefore of the complementary flap 9 parallel to the path 3.

The complementary flap 9 can further be fitted on the arm 14 by means of a pair of screws 17 which engage in a slot 18 formed in the arm 14 and elongated in a direction which is parallel to the path 3, so as to allow further adjustability of the position of the complementary flap 9, parallel to the path 3, with respect to the arm 14.

The movement of the complementary flap 9 towards or away from the flap 5 is achieved through second actuation means 19.

The first actuation means 10 can be constituted by an electric motor, preferably a step motor 20, which is connected by means of its body to an L-shaped element 21 which is fixed to the base plate 11 and has an output shaft in which a female thread is formed coaxially; said female thread is coupled to a threaded shaft 22 which is connected to an L-shaped element 23 which is fixed to the slider 2. The threaded shaft 22 is parallel to the path 3, so that the actuation of the step motor 20 produces the translatable motion of the slider 2 along the path 3 in one direction or in the opposite one.

As an alternative, the first actuation means can be constituted by a pneumatic cylinder which is connected, by means of its body, to the L-shaped element 21 and acts, by means of the stem of its piston, on the L-shaped element 23.

The second actuation means 19 can also be consti-

tuted by an electric motor, preferably a step motor 24, which is connected, by means of its body, to a post 25 which rises from the slider 2, passing through a suitable opening 26 formed in the arm 14. The step motor 24 has, like the step motor 20, an output shaft inside which a female thread is provided which is coupled to a threaded shaft 27 associated with the arm 14. In practice, the actuation of the step motor 24 causes the oscillation of the arm 14 and therefore of the complementary flap 9 about the axis 15 towards or away from the flap 5.

As an alternative, the step motor 24 too may be replaced with a pneumatic cylinder which is associated with the post 25 by means of its body and acts on the arm 14 by means of the stem of its piston.

Both the flap 5 and the complementary flap 9 have, at the needle work area, a recess 30, 31 to safely prevent any possibility of interference of the needle with the flap 5 and the complementary flap 9.

The complementary flap 9 can have different shapes according to the type of item to be sewn. In particular, the complementary flap 9 can have a smaller extension, assuming the configuration of a simple presser shoe if the item to be sewn is constituted by a pair of hosiery items having normal or reduced dimensions and thickness.

In addition, the recess 31 of the complementary flap 9 can be as large as to allow mounting, on the sewing machine, of a pressure foot adapted to press the fabric when the item to be sewn has a considerable thickness.

In an extreme condition, the end portion of the complementary flap 9, which in Figure 1 is taken up by the recess 31, can be completely lacking, just to create space for the pressure foot mounted on the sewing machine.

Advantageously, the flap 5 can move on command not only along the first actuation path 3 but also along a second actuation path 40, at right angles to the first actuation path 3, on a plane which is perpendicular to the working axis 4 of the needle of the sewing machine.

More particularly, as shown in Figure 2, in which the device has been shown only partially for the sake of simplicity, the base plate 11, on which the slider 2 is mounted, is fixed to a carriage 41 which can slide along a pair of guides 42a and 42b which are fixed to a supporting structure 43 and are parallel to the second actuation path 40. The carriage 41 can move on command along the guides 42a and 42b by virtue of third actuation means, which can be constituted by a fluid-actuated cylinder or, as shown, by an electric motor 44, for example a step motor, which is supported by the supporting structure 43 and is connected by means of its output shaft 45 to a threaded shaft 46 which engages a female thread formed in a block which is rigidly coupled to the carriage 41.

It should be observed that the device according to the invention has been conceived in particular to be used in a machine for sewing labels onto hosiery items,

for example of the type disclosed in EPA 95119751.6. In this application, the device is installed laterally to the conveyor belt 50 on which the hosiery items to be labelled, designated by the reference numerals 6a and 6b, are arranged so that the first actuation path 3 and the second actuation path 40 lie on a plane which is parallel to the plane of arrangement of the conveyor belt 50. More particularly, the first actuation path 3 is perpendicular to the travel path 51 of the conveyor belt 50, while the second actuation path 40 is parallel to the travel path 51 of the conveyor belt 50.

The sewing machine that sews the labels is arranged laterally to the conveyor belt 50. Owing to the fact that the flap 7, through of the movement of the base plate 11, can also be moved along the second path 40, the sewing machine can be fixed.

Operation of the positioning device according to the invention is as follows.

While the complementary flap 9 is spaced upward from the flap 5, the step motor 20 is actuated, causing the advancement of the slider 2 and therefore of the flap 5 along the path 3, so that it is arranged below the item to be sewn. Then the step motor 24 is actuated, moving the complementary flap 9 towards the flap 5 and thus clamping the item to be sewn. Clamping the item to be sewn also reduces its thickness, facilitating its passage below the needle. By actuating the step motor 20 again in reverse with respect to the previous actuation, the item to be sewn is moved with respect to the axis of the needle 4 by the chosen extent.

It should be noted that since the translatory motion of the slider 2 is independent of the actuation of the sewing machine, its extent can be changed according to the requirements linked to the position of the stitches to be produced.

After producing the stitches, the complementary flap 9, through the actuation of the step motor 24, is moved away from the flap 5 again and therefore the sewn item can be removed from the needle work area to allow to position a new item to be sewn.

By taking advantage of the possibility to move the flap 5 along the path 40, i.e., parallel to the travel path 51 of the conveyor belt 50, if the device is installed in an automatic labeling machine of the above-described type it is possible to remove the item to be sewn from the conveyor belt 50 upstream of the sewing machine and move it, possibly faster than the speed with which said conveyor belt 50 advances, under the sewing head of the sewing machine and then deposit it again on the conveyor belt 50 once the label has been applied. In this manner, the need is avoided to move the sewing machine to follow the item arranged on the conveyor belt 50 during sewing.

In practice it has been observed that the device according to the invention fully achieves the intended aim and objects, since it allows to fully meet the most disparate requirements for positioning the item to be sewn with respect to the needle of the sewing machine.

Moreover, thanks to the combined action of the flap and of the complementary flap, positioning the item to be sewn is not a problem also if said item is considerably thick.

The device thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may also be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the dimensions, may be any according to requirements and to the state of the art.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for positioning an item to be sewn for sewing machines, particularly for sewing labels onto hosiery items, in automatic labeling machines, characterized in that it comprises a slider which can slide along a first actuation path on a plane which is substantially perpendicular to the working axis of the needle of the sewing machine, said slider being rigidly coupled to a flap which can be placed in the needle work area below the item to be sewn, said slider further supporting, above said flap, a complementary flap which can move on command towards or away from said flap in order to produce, in cooperation with said flap, the engagement or release of the item to be sewn, first actuation means being provided which act on command on said slider to move it in one direction or in the opposite direction along said first actuation path.
2. A device according to claim 1, characterized in that said slider is supported by a base plate so that it can slide along said first actuation path on a substantially horizontal plane.
3. A device according to claim 1, characterized in that said complementary flap is mounted on the end of an arm which is pivoted, by means of its opposite end, to said slider about an axis which is substantially perpendicular to said first actuation path.
4. A device according to claim 3, characterized in that the region for the pivoting of said arm to said slider is adjustable along a path which is substantially parallel to said first actuation path.
5. A device according to claim 3, characterized in that said complementary flap is detachably associated

with said arm and is adjustable with respect to said arm along a path which is parallel to said first actuation path.

6. A device according to claim 1, characterized in that said flap has, in the needle work area, a recess to allow the passage of the needle. 5
7. A device according to claim 1, characterized in that said complementary flap has, in the needle work area, a recess to allow the passage of the needle. 10
8. A device according to claim 1, characterized in that said first actuation means comprise a fluid-actuated cylinder which is supported by said base plate and acts on said slider by means of the stem of its piston. 15
9. A device according to claim 1, characterized in that said first actuation means comprise an electric motor which is mounted on said base plate and is connected to said slider for its translatory motion along said first actuation path. 20
10. A device according to claim 9, characterized in that said electric motor of the first actuation means has an output shaft in which a female thread is provided which is coupled to a threaded shaft connected to said slider. 25
11. A device according to claim 9, characterized in that said electric motor of the first actuation means is constituted by a step motor. 30
12. A device according to claim 3, characterized in that it comprises second actuation means which act on said arm for its oscillation about said axis with respect to said slider in order to move said complementary flap towards or away from said flap. 35
13. A device according to claim 12, characterized in that said second actuation means comprise a fluid-actuated cylinder which is supported by said slider and acts on said arm by means of the stem of its piston. 40
14. A device according to claim 13, characterized in that said second actuation means comprise an electric motor which is mounted on said slider and is connected to said arm for its oscillation about said axis with respect to said slider. 45
15. A device according to claim 14, characterized in that said electric motor of said second actuation means has an output shaft in which a female thread is provided which is coupled to a threaded shaft connected to said arm. 50
16. A device according to claim 14, characterized in that said electric motor of the second actuation means is constituted by a step motor. 55
17. A device according to claim 1, characterized in that said flap can move on command, on said plane at right angles to the needle work axis, along a second actuation path which is perpendicular to said first actuation path.
18. A device according to claim 17, characterized in that it is associated laterally with a conveyor belt of an automatic labeling machine, said flap being movable on command, on a plane which is parallel to the plane of arrangement of said conveyor belt, along said second actuation path, which is parallel to the travel path of the conveyor belt, and along said first actuation path, which is perpendicular to said travel path of the conveyor belt, in order to grip or release an item placed on said conveyor belt and to position it in the needle work area of a sewing machine which is arranged laterally to said conveyor belt and so that the needle work axis is substantially perpendicular to the plane of arrangement of said conveyor belt.
19. A device according to claim 17, characterized in that said base plate is supported by a supporting structure so that it can slide along a path which is parallel to said second actuation path, third actuation means being provided which act on said base plate for its movement, with respect to said supporting structure, parallel to said second actuation path.

