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(72) Inventeur/Inventor:
REINDERS, PETER, DE

(73) Propriétaire/Owner:
SCHMALE-HOLDING GMBH & CO., DE

(74) Agent: SMART & BIGGAR IP AGENCY CO.

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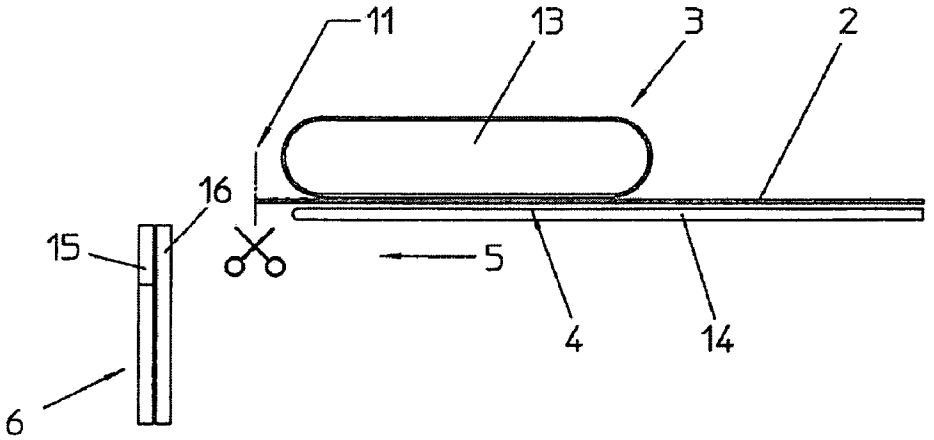

(57) Abrégé/Abstract:
The invention relates to a method of forming a loop (1, 1') from flexible ribbon (2) and for fixing the loop (1, 1') to a textile piece, comprising the following method steps: advancing a strip (4) of the ribbon (2) in a strip-travel direction (5) extending parallel to the strip (4) of ribbon from a ribbon supply, clamping an end (7) of the strip (4) leading in the strip-travel direction (5) at a first nip point (8) while advancing additional ribbon (2) from the ribbon supply until the strip (4) is of sufficient length and then clamping the strip (4) at a second nip point (10) spaced from the first nip point (8) at a trailing end (12) of the strip (4), and severing the ribbon (2) in the travel direction of the strip (2) upstream of the second nip point (10) to separate the strip (4) from the supplied ribbon (2) into a single strip of sufficient length to form the loop (1) that extends between the first nip point (8) and the second nip point (10).

Abstract:

The invention relates to a method of forming a loop (1, 1') from flexible ribbon (2) and for fixing the loop (1, 1') to a textile piece, comprising the following method steps:

advancing a strip (4) of the ribbon (2) in a strip-travel direction (5) extending parallel to the strip (4) of ribbon from a ribbon supply, clamping an end (7) of the strip (4) leading in the strip-travel direction (5) at a first nip point (8) while advancing additional ribbon (2) from the ribbon supply until the strip (4) is of sufficient length and then clamping the strip (4) at a second nip point (10) spaced from the first nip point (8) at a trailing end (12) of the strip (4), and severing the ribbon (2) in the travel direction of the strip (2) upstream of the second nip point (10) to separate the strip (4) from the supplied ribbon (2) into a single strip of sufficient length to form the loop (1) that extends between the first nip point (8) and the second nip point (10).

FIG. 4

METHOD AND APPARATUS FOR FORMING A LOOP

The invention relates to a method and apparatus for forming a loop from flexible ribbon and for fixing the loop to a textile piece, particularly to the edge of a textile piece.

Such apparatuses and methods are well known in the art. EP 0 607 196 [US 5,599,410] discloses an apparatus and a method of the operation thereof with which labels, including loop-fold labels, are produced from ribbon. Ribbon introduced into a feeder is transported by the feeder toward a gripper. The gripper picks up the ribbon, namely an end of the ribbon, while the feeder is moved back to its starting position. A folding plate is then set in motion whose direction of movement is aligned perpendicular to the clamped surface of the ribbon. The folding plate is moved in the strip-travel direction and folds it lengthwise, thereby forming a simple loop. The folding plate is retracted together with the strip into a positioning gripper that close simultaneously with a pair of scissors that separates the ribbon into a single ribbon, with the positioning gripper picking up the finished folded loop while the folding plate is returned to its starting position. The ends of the strip are then welded, and the loop is advanced to a sewing station, where it is fixed to the seam of a textile in the form of a label.

Alternatively, the apparatus can also be used to produce a flag label. In that case, the folding plate is advanced further after the scissors have severed the strip, and the loop that was previously folded in the a positioning gripper is straightened.

Only after the a positioning gripper close, can the little flag be fixed as a flag label to a textile piece.

Moreover, it is possible to produce U-shaped loops. The apparatus must be expanded for that purpose, however. In this embodiment, a carriage that enables the width of the ribbon to be varied is provided with a guide on the machine frame. In addition, a shaping plate and a U-shaped folding plate are one above the other in the apparatus, the ribbon resting on the shaping plate. The folding plate is moved downward from a position above the strip portion and moved relative to the shaping plate, so that it is below the level of the ribbon. Due to movement of the folding plate relative to the shaping plate, the legs of the strip are folded, thus forming a U-shaped loop. The shaping plate then pushes the loop in the manner described into the a positioning gripper.

The solutions that are known from the prior art have the disadvantage that different apparatuses are required in order to produce different label formats, so that in the event of a change in production, for example from a simple loop-fold label to a U-shaped label, elaborate modifications must be made to the apparatus, requiring replacing the apparatus for making a simple loop-fold label with another apparatus for making a U-shaped label. Although EP 0 607 196 discloses an apparatus that can make different types of label, additional elements must also be introduced into the apparatus to be able to produce a U-shaped label, for example. A V-shaped label cannot be made with this apparatus at all.

Taking this prior art as a point of departure, it is the object of the invention to provide an apparatus and a method that can make a variety of label formats in an especially cost-effective and simple manner.

In order to achieve this object, the invention proposes a method of forming a loop from a flexible ribbon material and for fixing the loop to a textile piece, comprising the following method steps: the ribbon material in the form of a strip is advanced in a travel direction extending in parallel to the strip from a ribbon supply or from a ribbon supply spool in a length sufficient to form the loop, the first end of the strip leading in the travel direction is clamped at a first clamping point, further ribbon material is advanced from the ribbon supply or from the ribbon supply spool until the strip is of sufficient length, in doing so, the strip forms a simple loop or also a straight ribbon strip, the strip is then clamped at a second clamping point spaced from the first clamping point and holding a second end of the strip, the ribbon material is severed in the travel direction behind the second clamping point, is separated from the supplied ribbon material as to form a single strip comprising a sufficient length to form the loop, the strip that has already been formed into a simple loop or can be formed into a loop extending between the first clamping point and the second clamping point, the thus positioned first and second ends are positioned transversely to the edge of the textile piece and are positioned thereon, or the thus positioned first and second ends are aligned from an aligning position that deviates transversely from the edge of the textile piece into a position in which they are positioned transversely to the edge of the textile piece, the loop is fixed at the ends to the textile piece.

Date Reçue/Date Received 2021-03-12

The ribbon formed into a loop can be a flat ribbon, a cord, or any other tape-like material. Any flexible material can be used as the ribbon.

The end of the strip leading in the strip-travel direction is clamped upon reaching a certain position. After the clamping at the first nip point, additional ribbon is advanced from the ribbon supply or fed off a ribbon supply spool until the strip is of sufficient length to form a loop.

To achieve this, the ribbon can be advanced further by a conveyor, for example, and quasi pushed and transported past the nip point, whereupon the further-advanced ribbon turns over and forms a loop. The ribbon is advanced until the strip has formed a simple loop of sufficient length.

Alternatively, however, the ribbon can also be advanced from the ribbon supply by a clamp that holds the strip at the first nip point, for example by moving the clamp in the strip-travel direction and pulling on the ribbon until the strip has sufficient length to form a loop. In this case, no loop is produced initially, but rather the strip forms a straight strip.

Date Reçue/Date Received 2021-03-12

Once the strip is present as a simple loop or as a straight strip, a trailing end of the strip is clamped and held at a second nip point spaced upstream from the first nip point.

If a simple loop has already been formed and the strip is clamped at the first and second nip point, the nip points lie one above the other. The ribbon is severed upstream in the strip-travel direction of the second nip point, and the simple loop can be fixed to the edge of the textile piece.

Alternatively, the simple loop can be further processed by positioning the leading end or the trailing end relative to the other end in the plane of the strip transverse to the strip-travel direction such that the ends are next to each other and a V-shaped loop is formed from the simple loop. It is also possible for both ends to be moved relative to each other in the plane of the strip transverse to the strip-travel direction so that the ends are next to each other and a V-shaped loop is formed.

Alternatively, the simple loop can be further processed such that one of the ends is pivoted about a pivot axis relative to the other end and a U-shaped loop is formed. Preferably, one of the ends is then moved relative to and away from the other end in the plane of the strip, so that the U-shaped loop is tensioned. It is also possible to move both ends away from each other on this plane in order to tension the loop.

If the ribbon is being advanced straight out of the ribbon supply and no looping has taken place, the leading end or the trailing end can be pivoted about at least one pivot axis so that the ends are one above the other or overlap at least partially

or are next to each other and the strip forms a simple loop, a V-shaped loop, or a U-shaped loop. If the ends are one above the other after pivoting and the strip is formed into a simple loop, then at least one of the ends can be moved away from the other end in the plane of the strip so that the ends are next to each other and, instead of the simple loop, a V-shaped loop is formed. Movement of one end away from the other end or of both ends away from each other can also occur when the ends are next to each other and the strip forms a U-shaped loop in order to tension the loop into a U-shape with spaced-apart legs.

Alternatively, if the ribbon is being fed from the ribbon supply and no looping has occurred, one of the ends can be moved relative to the other end or both ends can be moved relative to each other in the plane of the strip or parallel to this plane. In this way, it is possible to produce a simple loop shape, namely if the leading end or the trailing end is moved toward the other end or both ends are moved toward each other, so that the ends are one over the other, or a V-shaped loop, namely if both ends or the leading end or the trailing end is moved obliquely toward the other end, so that the ends are next to each other or overlap at least partially.

The ribbon is severed as it is moved in the strip-travel direction upstream of the second nip point. The severing can occur after the clamping at the second nip point and optionally before the ends are pivoted or moved, in which case there is the advantage that both ends are freely movable during pivoting or positioning. However, the severing can also occur only after pivoting or

positioning, in which case there is the advantage that time can be saved.

Depending on the orientation of the loop, the leading end and the trailing end must then be aligned in a position transverse to the textile piece in order to position the ends on the edge of the textile piece and enable the ends to be fastened to the textile piece. This is necessary, for example, when the strip-travel direction runs parallel to the edge of the textile piece. In this case, the ends of the fully formed loop face away from the edge of the textile piece and must extend toward the edge in order to enable them to be fastened to the textile piece. The alignment can be done by positioning or pivoting the ends or in any other way.

If the loop is already correct upon being formed. i.e. aligned transverse to the edge of the textile piece. then no alignment of the ends is necessary. This correct alignment is achieved if the strip-travel direction extends approximately transverse to the edge of the textile piece.

The formed loop can then be fixed in any manner to the textile piece.

The method steps are especially simple, variable, and inexpensive to implement and can all be performed in a compact apparatus with a simple construction. This eliminates costly modifications or conversion measures that had to be carried out with conventional methods when the production was to be changed over from one label format to another label format. With the present method, it is sufficient to program the apparatus carrying out the method according to the desired loop formation and to

adjust the sequence or the execution of the method steps accordingly.

Preferably, the strip-travel direction does not extend parallel but rather preferably substantially transverse to the edge of the textile piece.

A strip of the ribbon is preferably brought to the textile approximately transverse to the edge of the textile piece. By virtue of this orientation, for example transverse to the edge region, the advantage arises that all label formats can be fixed without subsequent rotation of the loop to the edge of the textile piece.

The expression "transverse to the strip-travel direction" should not be understood to mean that it must necessarily be a perpendicular orientation; for example, oblique orientations are included as well.

Preferably, the pivot axis extends substantially perpendicular and/or parallel to the plane of the strip of ribbon.

If a simple loop has already been formed after the feeding of the ribbon and the strip is clamped at a first and at a second nip point, the ends or nip points are one above the other. One of the ends is then pivoted about a pivot axis parallel to the plane of the strip relative to the other end, so that the simple loop is formed into a U-shaped loop. The pivoting about the parallel pivot axis is especially advantageous because no intervention occurs in the region in front of the strip, for example the advancing region of the textile piece; instead, the

movement takes place next to the textile piece or the edge region thereof.

If the ribbon is being advanced straight out of the ribbon supply and no looping has yet taken place, the leading end or the trailing end is pivoted about at least one axis. If one of the ends is pivoted about a pivot axis aligned substantially perpendicular to the plane of the strip, a U-shaped loop is formed. In this case, if one of the ends is pivoted about a pivot axis oriented substantially parallel to the plane of the strip, then a simple loop or a V-shaped loop is formed.

If the ribbon is being advanced straight out of the ribbon supply and no looping has yet taken place, if one of the ends is first pivoted about a pivot axis aligned substantially parallel to the plane of the strip, then a simple loop is formed. This end can be pivoted about an additional pivot axis aligned substantially perpendicular to the plane of the strip, whereby a U-shaped loop is formed.

The leading or trailing end can thus be pivoted about a pivot axis that runs parallel or perpendicular to the plane of the strip of ribbon.

It is also possible, however, for one of the ends to be pivoted about a plurality of pivot axes, for example a pivot axis substantially perpendicular and a pivot axis substantially parallel to the plane of the strip of ribbon.

Preferably, the first nip point is moved while entraining the leading end in the strip-travel direction or parallel to the

strip-travel direction until the strip is of sufficient length to form a loop.

As a result, the ribbon is pulled through the first nip point in the strip-travel direction and exerts a tensile force on the ribbon, so that it is advanced out of the ribbon supply or fed off the ribbon supply spool until the strip is of sufficient length to form a loop. The strip of ribbon then exists as a straight strip and can be formed into any loop.

Preferably, the leading end is moved to and positioned in a position outside the strip-travel path, below or above the strip-travel path, the ribbon being advanced further in the strip-travel direction via the positioning point until the desired length has been reached.

The positioning of the first nip point outside of the strip-travel path provides the advantage that, after the clamping of the first nip point, the ribbon turns over beyond the nip point as a result of the further conveyance of the ribbon and forms a loop in the desired direction. It is ensured that the ribbon does not slow down during conveyance and the formation of the loop is blocked.

Preferably the strip is severed from the ribbon before the pivoting and/or the positioning of the leading or trailing end.

The ribbon is severed upstream of the second nip point as it is moved in the strip-travel direction. The severing is preferably carried out after clamping the second nip point, since the strip is then fixed in its desired length, but optionally before pivoting or positioning, in which case the advantage is

achieved that both ends are freely movable during pivoting or positioning.

Alternatively, preferably the strip is severed from the ribbon after pivoting and/or positioning of the leading or trailing end.

This results in the advantage that time can be saved during the process.

Preferably, the strip is advanced through a shaping slide advanced from a starting position while entraining the ribbon until reaching a desired end position and the ribbon forms a simple loop during advancement with clamping of the leading end occurring before the shaping slide reaches the desired end position, and the shaping slide being moved back to its starting position after reaching the end position and the leading end being held clamped for the duration of the entire displacement operation, and with clamping of the trailing end of the strip preferably occurring during the rearward displacement of the shaping slide into the starting position or after the shaping slide reaches the starting position.

The shaping slide moves toward the first nip point, it being possible for the leading end to already be held clamped before the shaping slide is advanced. Alternatively, a clamping of the leading end can also take place only after the shaping slide has already advanced a bit. In any case, clamping takes place before the shaping slide reaches the desired end position, namely the front end position, so that the ribbon is clamped during displacement into the front end position and thereby fixed. As a

result, it is possible for the shaping slide to shape the ribbon into a loop by movement into the front end position. For this purpose, the shaping slide transports or pushes the ribbon above or below and past the first nip point until the strip forms a simple loop of the desired length.

After the shaping slide has reached the desired end position and formed the loop, the slider is moved back to its starting position, and the trailing end of the strip is held clamped. Meanwhile, the leading end is clamped, specifically at least for the entire duration of the entire displacement operation. Displacement of the shaping slide only ends when the shaping slide has reached its starting position again.

Clamping of the trailing end is preferably carried out while the shaping slide is being moved back to its starting position. However, it is also possible for the trailing end to be clamped only after the starting position is reached.

The clamped ends can then be moved or pivoted for further processing of the simple loop.

The shaping slide ensures for example that the loop is always formed correctly. The feed path can be set to a desired path length, the length dimension of the loop being also set.

Preferably the ribbon is advanced intermittently.

In this way, a loop can first be completed before additional ribbon is advanced.

Date Reçue/Date Received 2021-03-12

In order to achieve the object described above, the invention proposes an apparatus for forming a loop from a flexible ribbon material and for fixing the loop to a textile piece, in particular for carrying out a method as described herein, the apparatus comprising: a conveyor for the ribbon material, by means of which the ribbon material in the form of a strip is moved in a travel direction extending parallel to the strip from a ribbon supply in a length sufficient to form a loop, or is pulled off from a ribbon supply spool, a first clamp element, with a first end of the strip leading in the travel direction being held clamped by the first clamp element at a first clamping point of the strip, wherein the apparatus comprises a second clamp element, with a second clamping point of the strip spaced from the first clamping point being held clamped by the second clamp element, and between the clamping points the strip being formed to a loop, a separating device for severing the strip from the ribbon material, the strip comprising, after severing, a second end, and the second clamping point being arranged in a region of the second end.

Date Reçue/Date Received 2021-03-12

The ribbon formed into a loop can be a flat ribbon, a cord, or any other flexible tape-like material.

A strip of the ribbon is brought to the textile piece by the conveyor. The ribbon is advanced until the strip is of sufficient length to form a loop.

The strip is clamped by a first clamp at a first nip point and by a second clamp at a second nip point, the strip of ribbon intended for forming a loop being formed between the nip points.

The ribbon can already be formed as a simple loop or extend as a straight strip between the clamps.

A cutter separates the ribbon in the strip-travel direction of the second nip point, so that the strip is severed and the clamps are freely movable without being attached to the ribbon supply or hindered in their movement by the connection.

If the strip is already formed into a simple loop, it can be positioned and attached directly to the edge of the textile piece, for example by sewing the loop ends to the edge. In this case, the clamps with the nip points and the ends are approximately one above the other.

However, the simple loop can also be processed further in such a way that a V-shaped or a U-shaped loop is formed by pivoting and/or positioning the clamps and/or the nip points.

By pivoting one clamp to the other clamp, the simple loop is formed into a U-shaped loop, one of the nip points is then preferably moved away from the other nip point, or both nip points are moved away from each other in the plane of the strip or

parallel to this plane so that the strip is taut between the clamps.

Alternatively, a V-shaped loop is formed from the simple loop in that after the simple loop is formed, one of the nip points is moved relative to the other nip point or both nip points are moved relative to each other in the plane of the strip or parallel to this plane and the ends of the strip are next to each other and the strip forms a V-shape.

If the strip extends straight between the clamps and no looping has yet taken place, it is shaped into a simple loop shape or a V-shaped or U-shaped loop shape by pivoting or positioning the clamps or the nip points. In the case of a straight strip, the clamps are initially arranged so as to be approximately opposed in the strip-travel direction. To form a simple loop, one of the clamps is pivoted about a pivot axis relative to the other clamp, so that the clamps are together with the nip points and the ends be approximately one above the other. The strip between the clamps is thus formed into a simple loop. Subsequently, the simple loop can be further processed in that one of the nip points is moved relative to the other nip point, or both nip points are moved relative to each other in the plane of the strip or parallel to this plane such that the ends of the strip are next to each other and the strip forms a V-shape.

Alternatively, the pivoting can also take place in such a way that the clamps are together with the nip points and the ends adjacent each other or overlap partially after pivoting, thus forming a V-shaped loop.

Alternatively, there is no pivoting of the clamps to form a simple loop, but rather positioning of the nip points relative to each other. In that case, one of the approximately opposing nip points is moved relative to the other nip point in the plane of the strip or parallel to this plane, so that the nip points are together with the ends of the strips and next to each other or one above the other or overlap at least partially and the strip forms a V-shape or a simple loop. It is also possible to move both nip points relative to each other.

For the purpose of pivoting and/or positioning the clamps or the nip points, the apparatus has a pivoting device and/or a positioning device.

If one of the clamps is pivoted about a pivot axis relative to the other clamp such that a U-shaped loop is formed from the simple loop or from the straight strip, then the first nip or the second nip is preferably moved subsequently relative to the other nip point or both nip points are moved relative to each other in the plane of the strip, so that the U-shaped loop between the clamps is tensioned.

The formed loop can then be fixed in any manner to the textile piece.

A positioning device is preferably provided that positions the ends of the strip on the edge of the textile piece such that they can be fixed in a precise manner to the textile piece. The positioning device can be a second pivoting device or positioning device, for example. Depending on the orientation of the loop, the leading end and the trailing end can be aligned

together with this positioning device in a position transverse to the textile piece in order to precisely position the ends on the edge of the textile piece and enable them to be fastened thereto. This is necessary, for example, if the ends of the finished loop face away from the edge of the textile piece and therefore need to be aligned and positioned toward the edge.

Preferably, a conveyor is also provided that transports the textile piece with the positioned ends of the strip to a fastening device, and the fastening device fastens the ends of the strip to the textile piece in the correct position.

This apparatus is especially simple and inexpensive to implement and can be consolidated in a compact design. The apparatus makes it possible to form different label formats without having to undertake extensive conversion measures or modifications.

Preferably, the strip-travel direction is not oriented parallel but rather preferably substantially transverse to the edge of the textile piece.

It is advantageous that all label formats can be formed from this position and the loops can be fixed to the edge of the textile piece without subsequent rotation or pivoting. The expression "transverse to the strip-travel direction" does not necessarily refer to an orientation perpendicular to the edge of the portion. Skew orientations are also included, for example.

Preferably, the pivot axis is aligned substantially perpendicular and/or parallel to the plane of the strip of ribbon.

If a simple loop has already been formed and the strip is clamped by the first and the a second clamp to the first and the

nip point, the ends or the nip points are one above the other. One of the clamps can then be or is then pivoted about a pivot axis substantially parallel to the plane of the strip relative to the other clamp so that the simple loop is formed into a U-shaped loop. The pivoting about the parallel pivot axis is especially advantageous because it does not interfere with the clamps in the area in front of the apparatus, for example the area in which the textile pieces are transported.

If the strip of ribbon extends in a straight line between the clamps and no loop formation has yet taken place, the first clamp or the second clamp can be or is pivoted about at least one axis and the straight strip is formed into a simple loop. In the case of a straight strip, the clamps are initially arranged so as to be approximately opposed in the strip-travel direction.

If one of the clamp is pivoted about a pivot axis aligned substantially perpendicular to the plane of the strip, then the clamps are next to each other and the strip is formed into a U-shaped loop.

If one of the clamps is pivoted about a pivot axis aligned substantially parallel to the plane of the strip, then the clamps are one above the other and the strip is formed into a simple loop.

If the ribbon is being advanced straight out of the ribbon supply and no looping has yet taken place, if one of the clamps is first pivoted about a pivot axis aligned substantially parallel to the plane of the strip, then a simple loop is formed. This clamp can be subsequently pivoted about an additional pivot

axis aligned substantially perpendicular to the plane of the strip so that a U-shaped loop is formed.

The first or second clamp can thus be pivoted about a pivot axis that runs parallel or perpendicular to the plane of the strip of ribbon.

It is also possible, however, for one of the clamps to be pivoted about a plurality of pivot axes, for example about a pivot axis substantially perpendicular and a about pivot axis substantially parallel to the plane of the strip of ribbon.

Preferably the conveyor is a belt drive with a transport base, and the ribbon is advanced between the belt of the belt drive and the transport base.

Preferably the transport base is embodied as a shaping slide or that a shaping slide is additionally arranged in the apparatus, in which case the belt drive and/or the shaping slide can be advanced from a starting position in the strip-travel direction into a working position in which the ribbon is shaped into a simple loop and can be moved back into the starting position.

The shaping slide can be moved above or below the first nip of a starting position into a working position in which the shaping slide is in a front end position, and, upon advancing from the starting position to the working position, pushes the ribbon in the strip-travel direction past the first nip point until the strip forms a U-shaped loop of the desired length. Preferably, the belt drive is entrained at least partially in the strip-travel direction.

The shaping slide and, optionally, the belt drive is then moved back to its starting position. The shaping slide ensures for example that the loop is always formed correctly. The feed path can be set to a desired path length, whereby the length dimension of the loop is also set.

For example the belt drive is set in a conveying position in which the ribbon is pressed against the transport base by the belt of the belt drive and advanced over the transport base, in which case the belt drive can be preferably moved from the conveying position to a rest position in which the belt drive disengages from the ribbon.

When the belt drive is in the conveying position, the ribbon is pressed against the transport base by the belt of the belt drive and advanced over the transport base in the strip-travel direction. In the meantime, the transport base or a shaping slide acting as a transport base can be moved along with the ribbon in the strip-travel direction in order for example to form the ribbon into a loop.

Preferably, the belt drive can also be moved to a rest position in which the belt drive does not touch the ribbon. This enables the ribbon to move freely in the strip-travel direction together with the transport base or the shaping slide in a simple manner. This is also advantageous if the ribbon is being advanced out of the ribbon supply by the first clamp or fed off the ribbon spool, since the ribbon can be advanced without resistance.

Preferably the first clamp can be moved while entraining the leading end in the strip-travel direction or parallel to the strip-travel direction.

As a result, the first clamp tautens the ribbon and pulls it out of the ribbon supply or off the ribbon spool.

Preferably, the first and/or the second clamp has or is a conveyor with which the leading end and/or the trailing end can be moved away from the other end.

If the strip is already a U-shaped loop, this can position the nip points and hence the ends, and the strip can be tensioned between the clamps.

Alternatively, if the nip points lie one over the other and the strip forms a simple loop, a V-shaped loop can be formed as a result of the movement apart.

Preferably the first and/or the second clamp is a gripper.

Preferably the first and/or the second clamp is a belt drive with a support element situated opposite the belt drive, the strip being arranged with its first and/or second nip point between the belt or the feed roller of the belt drive and the support element.

The first and/or second clamp can thus clamp at the first and/or second nip point and acts as an adjuster for orienting the nip points relative to each other. The combination of the two functions in one element is especially space-saving.

For the same reason, the first and/or the second clamp is an adjustable clamp, in which case the strip is held clamped with

its first and/or second nip point between components of the clamp and can be moved with the clamp.

Preferably, the ends project past the nip points and can be fixed to the textile piece with the projecting portion.

The projecting portions of the leading and trailing ends can be easily fixed to the edge of the textile piece.

In addition, an adjustable computer control is provided that corresponds to the apparatus components and controls their activities and functions, namely

the conveyor (3),

the first clamp (6),

the second clamp (9),

the cutter (11),

the pivoting device,

the adjuster,

the positioning device, and

preferably the fastening device.

The computer control, which can be operated by the user of the apparatus, allows the user to easily enter settings in order to achieve the desired loop shape, loop length, loop positioning, and other useful parameters. The apparatus itself remains unchanged, so no time- and cost-intensive conversion measures are required, but rather only simple programming of the adjustable computer control.

An embodiment of the invention is illustrated in the drawing and described in further detail in the following.

In the drawing:

FIG. 1 is a side view of a apparatus according to the invention in the starting position;

FIG. 2 is a side view of the apparatus with an open gripper;

FIG. 3 is a side view of the apparatus with a closed gripper and advanced shaping slide;

FIG. 4 is a side view of the apparatus with retracted shaping slide and closed second clamp;

FIG. 5 is a side view of the apparatus after severing of the strip of ribbon from the ribbon;

FIG. 6 is a top view of the same;

FIG. 7 is a side view of the apparatus with pivoted second clamp;

FIG. 8 is a front view of the same;

FIG. 9 is a top view of the same;

FIG. 10 is a side view of the apparatus with pivoted and moved second clamp;

FIG. 11 is a front view of the same; and

FIG. 12 is a top view of the same.

FIGS. 1 to 12 show the steps of a method of forming a loop 1, 1' made of flexible ribbon 2 and for fixing the loop 1, 1' to a textile piece, particularly to the edge of a textile piece, and a possible embodiment of an apparatus for carrying out the method.

The textile piece is not shown in the drawing, but in FIGS. 1 to 7 it is to the left of the illustrated components of the apparatus.

For forming the loop 1, 1' from flexible ribbon 2 and for fixing the loop 1, 1' to a textile piece, particularly to the edge of a textile piece, the apparatus has

a conveyor 3 that moves a strip 4 of the ribbon 2 in a strip-travel direction 5 extending parallel to the strip 4 of ribbon but not parallel to and preferably transverse to the edge of the textile piece from a ribbon supply or pulls it off a ribbon supply spool in a length sufficient to form a loop,

a first clamp 6 gripping a leading end 7 of the strip 4 in the strip-travel direction 5 at a first nip point 8 of the strip 4,

a second clamp 9 gripping the strip 4 at a second nip point 10 spaced from the first nip point 8 for forming a loop forming between the nip points 8, 10 of the strip 4 of ribbon,

a cutter 11 for severing the ribbon 2 a single strip 4 having after severing a trailing end 12 and with the second nip point 10 being at the trailing end 12,

preferably a pivoting device that can pivot the first clamp 6 relative to the second clamp 9 about at least one pivot axis 21 aligned substantially parallel to a plane of the strip 4 of ribbon, and

preferably an adjuster that can position the second nip point 10 relative to the first nip point 8 in the plane of the strip 4 or parallel thereto so that the strip 4 of ribbon forms a U-shaped loop 1' whose ends 7, 12 are next to each other and are positioned on and fixable to the edge of the textile,

preferably a positioning device that positions the ends 7, 12 at the edge of the textile piece and a conveyor that transports the textile piece with the positioned ends 7, 12 of the strip to a fastening device that fastens the ends 7, 12 of the strip to the textile piece in a correct position.

The ribbon 2 formed into a loop 1, 1' can be a flat ribbon, a cord, or any other ribbon.

FIG. 1 shows the starting situation in which the ribbon 2 is advanced from the ribbon supply located to the right or fed off a ribbon supply spool. The ribbon 2 is preferably advanced intermittently. In this way, it is always possible for a loop 1, 1' to be completed before additional ribbon 2 is advanced.

The ribbon 2 is advanced in a strip-travel direction 5 extending parallel to the strip 4 of ribbon and not parallel but preferably transverse to the edge of the textile piece in the form of a strip 4 from the ribbon supply or fed off the ribbon supply spool in a length sufficient to form a loop. By virtue of this orientation, for example transverse to the edge of the textile piece, the advantage arises that all label formats can be fixed without subsequent rotation or pivoting of the loop 1, 1' to the edge of the textile piece.

FIG. 1 shows the first clamp 6 embodied here as a gripper that is initially closed and intended to later clamp and hold the ribbon 2 at the first nip point 8.

The conveyor 3 is a belt drive 13 with for example a transport base 14 constituted as a shaping slide and the ribbon 2 being advanced between the belt of the belt drive 13 and the

transport base 14. The direction of rotation of the belt drive is indicated in FIG. 2 with an arrow.

The shaping slide can be moved from the starting position shown in FIG. 1 while entraining the ribbon 2 in the travel direction 5 of the strip 4 (toward the left) into a working position shown in FIG. 3 and in which the shaping slide 4 is in the desired upstream end position in which the ribbon 2 is formed into a simple loop 1 and the slide 4 can be moved back again into the starting position (see FIG. 4 and FIG. 5). Also, the belt drive 13 is movable at least over a portion of the feed path together with the shaping slide in the strip-travel direction 5 in order to bring the ribbon 2 to the gripper.

In order to enable the shaping slide to carry the ribbon 2 along in the strip-travel direction 5, the belt drive 13 can be moved from a conveying position, in which the ribbon 2 is pressed by the belt of the belt drive 13 against the transport base 14 and is advanced over the transport base 14, into a rest position in which the belt drive 13 releases the ribbon 2. The conveying position is illustrated for example in FIGS. 1, 2 and 4. FIG. 3 shows the rest position of the belt drive 13 in which the belt drive 13 does not touch the ribbon 2. In this position, the ribbon 2 can be easily moved together with the shaping slide in the strip-travel direction 5.

FIG. 2 shows the apparatus with an open gripper. The gripper is opened before the ribbon 2 or the leading end 7 reaches the gripper so that the ribbon 2 can be passed through the opening formed by the open legs 15, 16 of the gripper. While entraining

the ribbon 2, the shaping slide pushes the leading end 7 of the strip 4 in the strip-travel direction 5 toward the open gripper until the end 7 has been advanced through the open gripper in the desired length. Then the gripper closes so that the leading end 7 of the strip 4 is clamped at the first nip point 8 by the clamping legs 15, 16 of the gripper (for example, see FIG. 3 and FIG. 4).

As FIGS. 3 and 4 show, the leading end 7 is moved to and positioned in a position outside the strip-travel path of the ribbon, below the strip-travel path, the ribbon 2 being advanced further in the strip-travel direction 5 via the positioning point until the desired length of the loop 1 has been reached. The positioning of the first nip point 8 outside the strip-travel path provides the advantage that the shaping slide can be pushed along with the ribbon 2 past the first nip point 8.

As FIG. 3 shows, the shaping slide is moved above the first nip point 8 from the starting position into a working position (the desired end position) and, upon advancing from the starting position to the working position, pushes the ribbon 2 in the strip-travel direction 5 past the first nip 8 or the first clamp 6 until the strip 4 forms a simple loop 1 of the desired length. The length depends on the feed path of the shaping slide. Then, as shown in FIG. 4, the shaping slide is moved back until it has reached its starting position (FIG. 5). The shaping slide ensures for example that the loop 1 is always formed correctly. The feed path can be set to a desired path length, and the length dimension of the loop 1 is also set.

The strip 4 is then clamped at a second nip point 10 by the second clamp 9, as shown for example in FIG. 4, the second nip point 10 being spaced vertically from the first nip point 8 and arrests the trailing end 12 of the strip 4. The ends 7, 12 and the nip points 8, 10 are one above the other. The ribbon 2 is severed by the cutter 11 in the strip-travel direction 2 upstream of the second nip point 10 and severed from the supplied ribbon 2 and into a single strip of sufficient length to form the loop 1 (see FIG. 5).

Severing of the ribbon 2 preferably occurs after the clamping at the second nip point 10 and optionally before the ends 7, 12 are pivoted or moved, in which case there is the advantage that both ends 7, 12 are freely movable for the purpose of pivoting or positioning. However, the severing can also occur only after pivoting or positioning. The cutter 11 is shown schematically in the figures as a pair of scissors.

As shown in FIG. 4, the strip 4 that has already been formed into a simple loop 1 extends between the first nip point 8 and the second nip point 10.

The simple loop 1 can either be fixed to the edge of the textile piece or processed into another loop shape, such as for example a V-shaped or a U-shaped loop 1'.

If further processing of the simple loop 1 into a V-shaped loop is to be performed, one of the clamps 6 or 9 is moved relative to the other clamp 6 or 9 in the plane of the strip 4. For this purpose, for example, the clamp 6 or 9 is embodied as a belt drive with a support element opposite the belt drive, the

strip 4 being arranged with its nip point 8 or 10 between the belt of the belt drive and the support element. The clamp 6 or 9 can clamp at the second nip point 8 or 10 and act as a positioning device for positioning the nip point 8 or 10. In this way, a V-shaped loop with ends 7, 12 next to each other is formed from the simple loop with ends 7, 12 one over the other. The loop can then be fixed to the textile piece. This operation is not shown in the figures.

As shown in FIGS. 7 to 9, if a U-shaped loop 1' is to be formed from the simple loop 1, the leading end 7 is pivoted relative to the trailing end 12 and the second clamp 9 by a pivoting device (not shown) with the first clamp 6 rotating about a pivot axis 21 extending substantially parallel to the plane of the strip 4 of ribbon in order to form the U-shaped loop 1'. Subsequently or at the same time, the second clamp 9 is moved relative to the first clamp 6 in the plane of the strip 4 so that the U-shaped loop 1' is tensioned between the nip points 8, 10. The movement is shown particularly in FIG. 11, with the end before the movement being indicated by a dashed line and shown at 19. The movement takes place as indicated by the arrow 20, 20'.

For this purpose, the clamp 9 is a belt drive with a support element 18 situated for example opposite the belt drive, the strip 4 being positioned with its second nip point 10 between the belt of the belt drive 17 and the support element 18.

The clamp 9 can thus grip the second nip point 10 and act as an adjuster for moving the nip points 8, 10 away from each other. The combination of the two functions in one element is

especially space-saving. The belt drive 17 acts as a conveyor with which the second nip point 10 can be moved away from the first nip point 8 parallel to the edge of the textile piece. As soon as the strip 4 has been deformed into a U-shaped loop 1', movement of the nip points 8, 10 relative to each other can take place, and the loop 1' can be tensioned between the clamps 6, 9 as shown in FIG. 12.

The ends 7, 12 are positioned side by side, and ends 7 and 12 of the loop 1' can then be fixed to the textile piece in any manner.

The adjacent ends 7, 12 project past the nip points 8, 10 and can be easily fixed to the textile piece.

A positioning device that locates the ends 7, 12 at the edge of the textile piece and a conveyor that transports the textile piece with the positioned ends 7, 12 of the strip to a fastening device, and the fastening device that fastens the ends 7, 12 of the strip to the textile piece in the correct position are not shown in the drawing.

The method and apparatus are especially simple and inexpensive to implement and can be consolidated in a compact apparatus and carried out. This eliminates costly modifications or conversion measures that have to be carried out with conventional methods and apparatuses when a changeover is made during production from one label format to another label format. With the present method and apparatus, it is sufficient to perform appropriate programming of the existing adjustable computer control for the functional and motion sequences in order for the desired method

steps that are required for the desired label format to be carried out.

CLAIMS:

1. A method of forming a loop from a flexible ribbon material and for fixing the loop to a textile piece, comprising the following method steps:

- the ribbon material in the form of a strip is advanced in a travel direction extending in parallel to the strip from a ribbon supply or from a ribbon supply spool in a length sufficient to form the loop,
- the first end of the strip leading in the travel direction is clamped at a first clamping point,
- further ribbon material is advanced from the ribbon supply or from the ribbon supply spool until the strip is of sufficient length,
- in doing so, the strip forms a simple loop or also a straight ribbon strip,
- the strip is then clamped at a second clamping point spaced from the first clamping point and holding a second end of the strip,
- the ribbon material is severed in the travel direction behind the second clamping point, is separated from the supplied ribbon material as to form a single strip comprising a sufficient length to form the loop,
- the strip that has already been formed into a simple loop or can be formed into a loop extending between the first clamping point and the second clamping point,
- the thus positioned first and second ends are positioned transversely to the edge of the textile piece and are positioned thereon,

Date Reçue/Date Received 2021-03-12

- or the thus positioned first and second ends are aligned from an aligning position that deviates transversely from the edge of the textile piece into a position in which they are positioned transversely to the edge of the textile piece,
- the loop is fixed at the ends to the textile piece.

2. The method of claim 1, wherein the first end of the strip clamped at the first clamping point or the second end of the strip clamped at the second clamping point is pivoted about at least one pivot axis relative to the respectively other end so that a simple loop or a u-shaped loop or a v-shaped loop is formed, in which the ends, namely the first end and the second end, are positioned on top of each other or partially overlap each other or are positioned next to each other.

3. The method of claim 1 or claim 2, wherein the first end of the strip clamped at the first clamping point or the second end of the strip clamped at the second clamping point relative to the respectively other end or both ends is or are adjusted relative to each other in the plane that is spanned by the strip, or in parallel to this plane so that a simple loop or a u-shaped loop or a v-shaped loop is formed, in which the ends, are positioned on top of each other or partially overlap each other or are positioned next to each other.

4. The method according to one of claims 1 to 3, wherein the loop is fixed at the edge of the textile piece.

5. The method according to one of claims 1 to 4, wherein the travel direction extends transversely to the edge of the textile piece.

Date Reçue/Date Received 2021-03-12

6. The method according to one of claims 1 to 5, wherein the pivot axis extends substantially perpendicular or parallel to the plane spanned by the strip.

7. The method according to one of claims 1 to 6, wherein the first clamping point is moved while entraining the first end in the travel direction or parallel to the travel direction of the ribbon material, until the ribbon has the length sufficient to form a loop.

8. The method according to one of claims 1 to 7, wherein the first end is moved and positioned into a position outside of the travel path, below or above the travel path, the ribbon material being moved past the positioning point in the travel direction, until the desired length is achieved.

9. The method according to one of claims 1 to 8, wherein the ribbon, before pivoting and/or after adjusting the first or second end, is separated from the ribbon material.

10. The method according to one of claims 1 to 9, wherein the ribbon, after pivoting and/or adjusting the first or second end, is separated from the ribbon material.

11. The method according to one of claims 1 to 10, wherein the strip is advanced through a shaping slide that is moved from a starting position while entraining the ribbon material until reaching a desired end position and forms the ribbon material during forward advancement to a simple loop, while clamping the first end, before the shaping slide reaches the desired end position, with the shaping slide being moved rearward back to its starting position after reaching the end position and

Date Reçue/Date Received 2021-03-12

the first end being held clamped for the duration of the entire advancement operation, while clamping of the second end of the strip occurs during the rearward movement of the shaping slide into the starting position or after the shaping slide reaches the starting position.

12. The method according to one of claims 1 to 11, wherein the ribbon material is advanced intermittently.

13. An apparatus for forming a loop from a flexible ribbon material and for fixing the loop to a textile piece, in particular for carrying out a method according to one of claims 1 to 12, the apparatus comprising:

- a conveyor for the ribbon material, by means of which the ribbon material in the form of a strip is moved in a travel direction extending parallel to the strip from a ribbon supply in a length sufficient to form a loop, or is pulled off from a ribbon supply spool,
- a first clamp element, with a first end of the strip leading in the travel direction being held clamped by the first clamp element at a first clamping point of the strip, wherein the apparatus comprises
- a second clamp element, with a second clamping point of the strip spaced from the first clamping point being held clamped by the second clamp element, and between the clamping points the strip being formed to a loop,
- a separating device for severing the strip from the ribbon material, the strip comprising, after severing, a second end, and the second clamping point being arranged in a region of the second end.

Date Reçue/Date Received 2021-03-12

14. The apparatus of claim 13, wherein the loop is fixed to the edge of the textile piece.

15. The apparatus of claim 13 or 14, wherein the apparatus comprises a pivoting device that can pivot or pivots the first clamp element or the second clamp element, for forming a loop, about at least one pivot axis relative to the respectively other clamp element so that the strip forms a simple loop or a u-shaped loop or a v-shaped loop, with the ends being arranged on top of each other or at least partially overlapping each other or being arranged next to each other, and being positioned at the edge of the textile piece and being fixable or fixed thereto.

16. The apparatus according to one of claims 13 to 15, wherein the apparatus comprises an adjustment device, by means of which the first clamping point or the second clamping point is or are adjustable or adjusted relative to the respectively other clamping point or both clamping points relative to each other in the plane spanned by the strip or parallel to this plane so that the strip forms a simple loop or a u-shaped loop or a v-shaped loop, in which the ends are arranged on top of each other or at least partially overlap each other or are arranged next to each other, and are positioned at the edge of the textile piece and are fixable or fixed thereto.

17. The apparatus according to one of claims 13 to 16, wherein the apparatus comprises a positioning device that positions the ends at the edge of the textile piece, and a conveyor device that transports the textile piece with the positioned ends of the ribbon to a

Date Reçue/Date Received 2021-03-12

fastening device that fastens the ends of the ribbon to the textile piece in the correct position.

18. The apparatus according to one of claims 13 to 17, wherein the travel direction does not extend parallel, but is aligned transversely to the edge of the textile piece.

19. The apparatus according to one of claims 13 to 18, wherein the pivot axis is aligned substantially perpendicular or parallel to the plane spanned by the strip.

20. The apparatus according to one of claims 13 to 19, wherein the conveyor is a belt drive with a transport base, and the ribbon material is advanced between the belt of the belt drive and the transport base.

21. The apparatus of claim 20, wherein the transport base is configured as a shaping slide, or that additionally a shaping slide is provided in the apparatus, with the belt drive and/or the shaping slide being movable forward from a starting position in the travel direction of the strip into a working position, in which the ribbon material is formed to a simple loop, and back again into the starting position.

22. The apparatus of claim 20 or 21, wherein the belt drive is set to a conveying position, in which the ribbon material is pressed, by the belt of the belt drive, against the transport base and is advanced over the transport base, with the belt drive being adjustable from the conveying position to a rest position, in which the belt drive releases the ribbon material.

Date Reçue/Date Received 2021-03-12

23. The apparatus according to one of claims 13 to 22, wherein the first clamp element can be moved while entraining the first end in the travel direction or parallel to the travel direction of the ribbon material.

24. The apparatus according to one of claims 13 to 23, wherein the first and/or the second clamp element comprises a conveyor device or is a conveyor device, by means of which the first end and/or the second end can be moved away from the respectively other end.

25. The apparatus according to one of claims 13 to 24, wherein the first and/or the second clamp element is a pair of pliers.

26. The apparatus according to one of claims 13 to 25, wherein the first and/or the second clamp element is a belt drive with a support element opposite to the belt drive, the strip being arranged with its first and/or second clamping point between the belt of the belt drive or the advance roller and the support element.

27. The apparatus according to one of claims 13 to 26, wherein the first and/or the second clamp element is an adjustable clamp, the strip being held clamped with its first and/or second clamping point between components of the clamp and being adjustable with the clamp.

28. The apparatus according to one of claims 13 to 27, wherein the ends project past the clamping points and are fixable with the projecting portion to the textile piece.

29. The apparatus according to one of claims 13 to 28, wherein an adjustable computer controller is provided

Date Reçue/Date Received 2021-03-12

that corresponds to the components of the apparatus and controls their activities and functions, namely

- the conveyor,
- the first clamp element,
- the second clamp element,
- the separating device,
- the pivoting device,
- the adjustment device,
- the positioning device.

30. The apparatus according to claim 29, wherein the computer controller corresponds to the fastening device and controls its activity and function.

Date Reçue/Date Received 2021-03-12

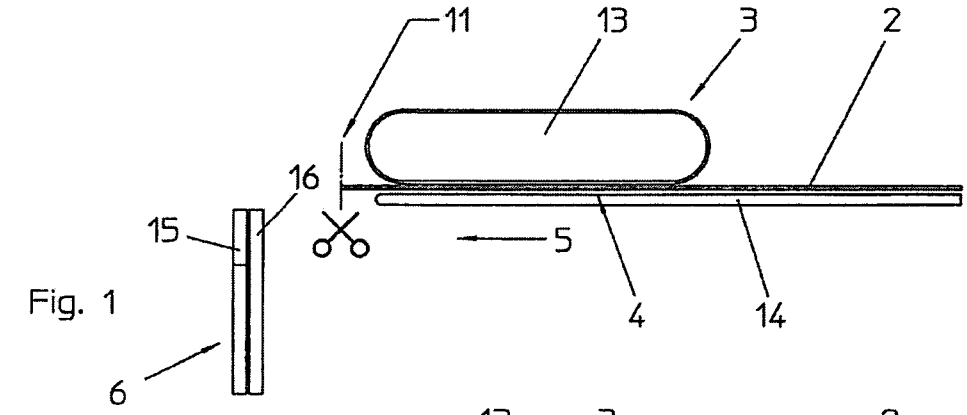

Fig. 1

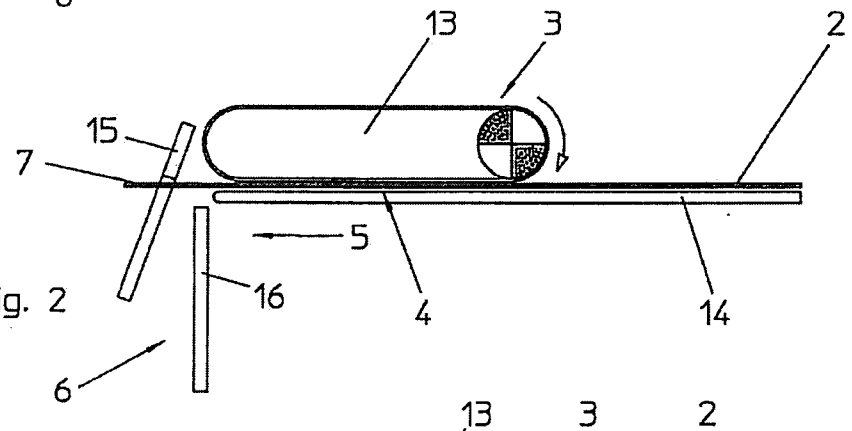

Fig. 2

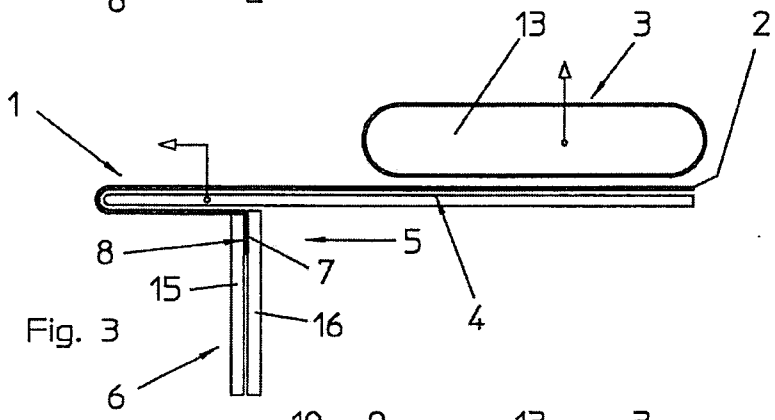

Fig. 3

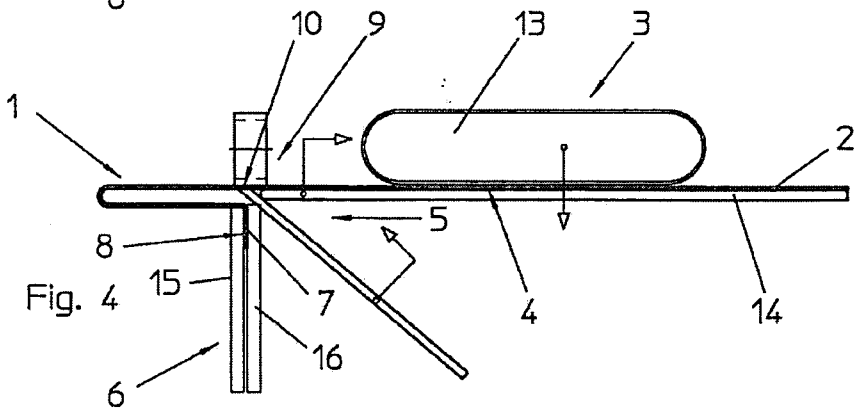

Fig. 4

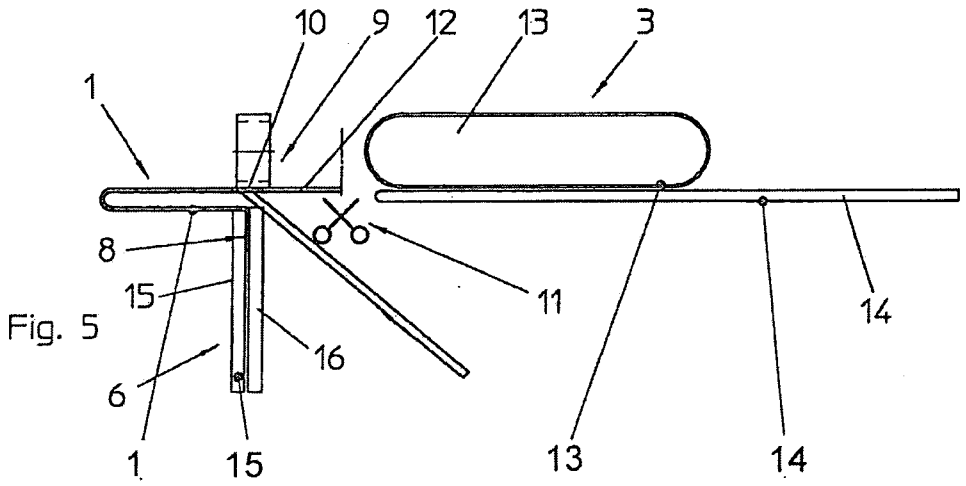
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Fig. 5

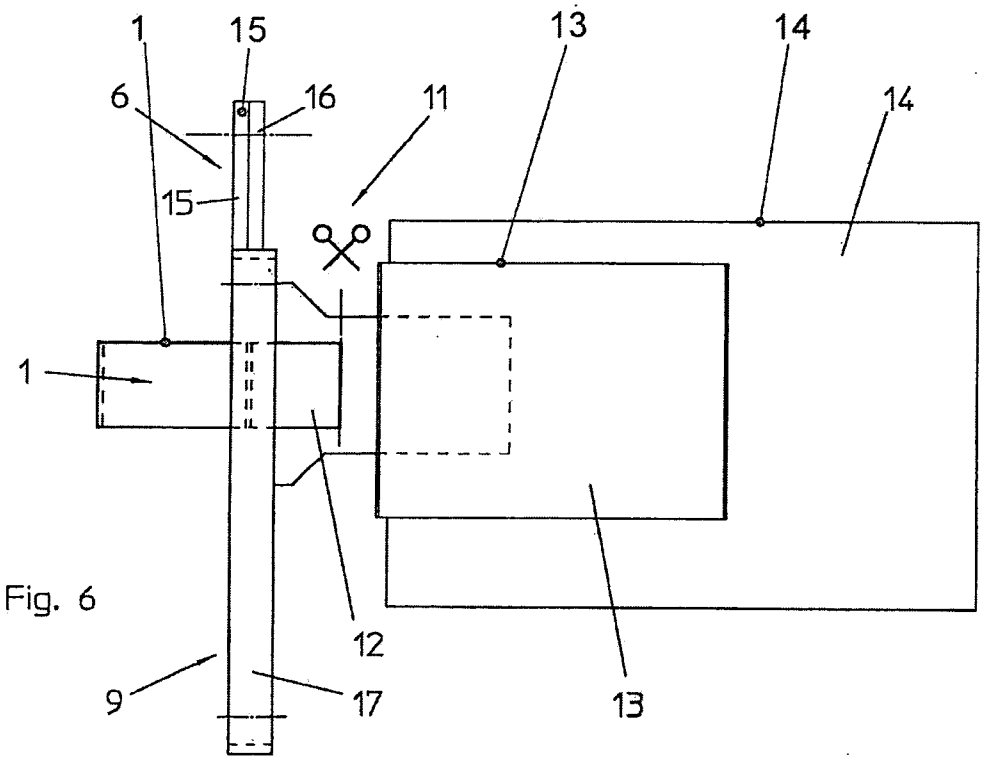
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Fig. 6

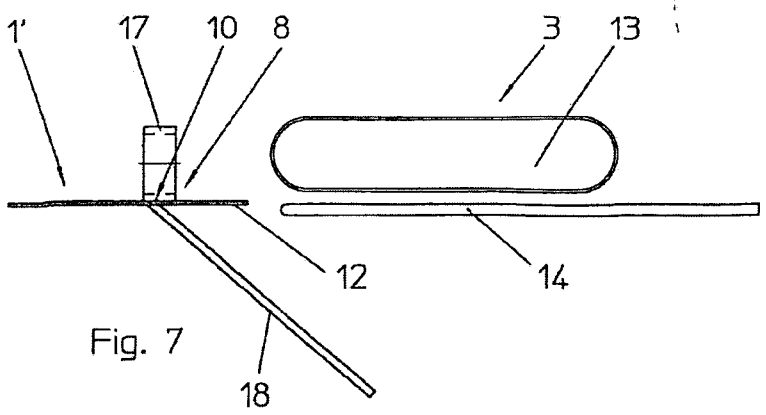


Fig. 7

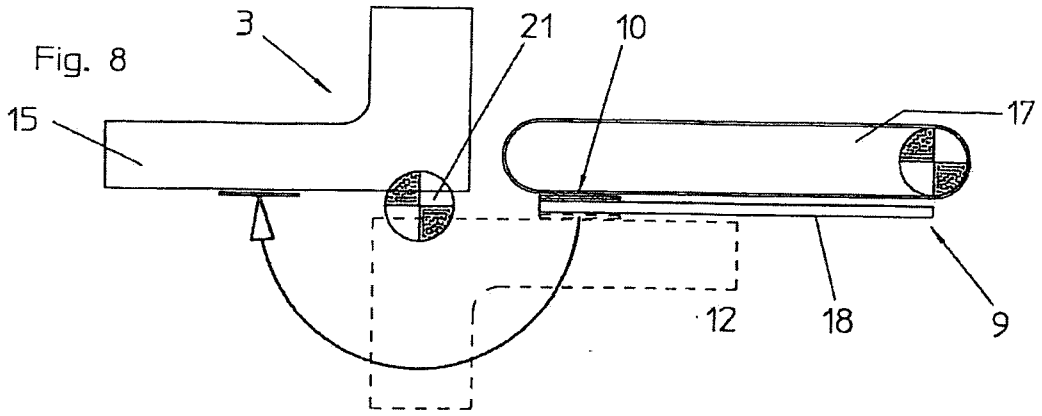


Fig. 8

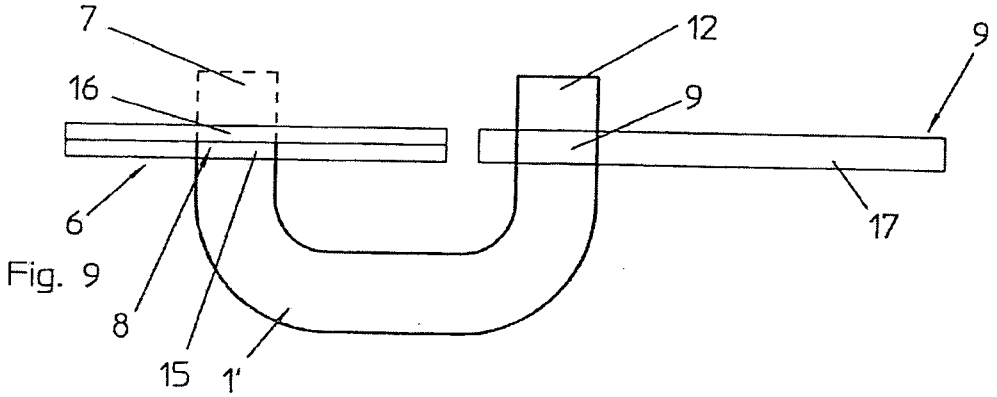


Fig. 9

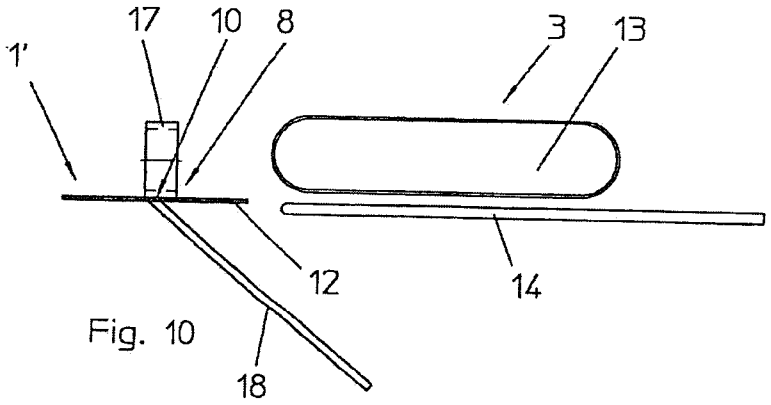


Fig. 10

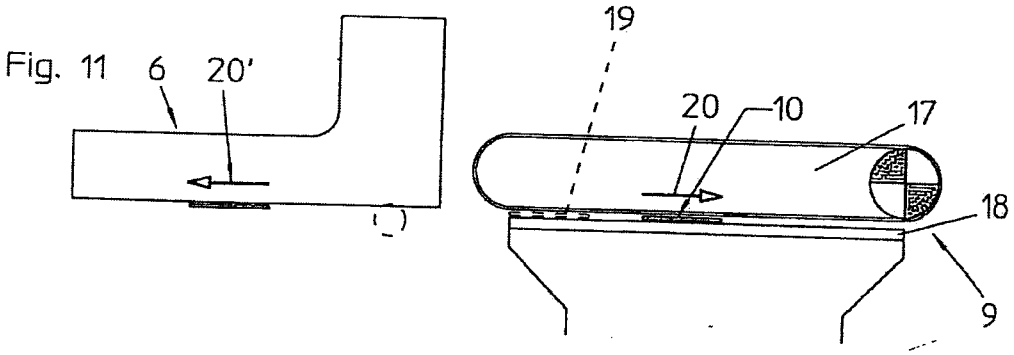


Fig. 11

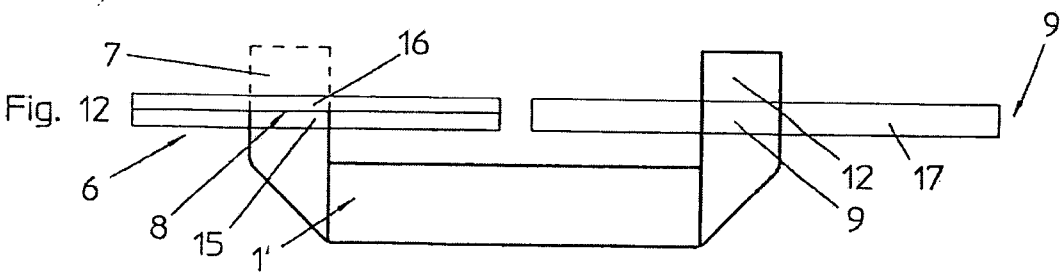
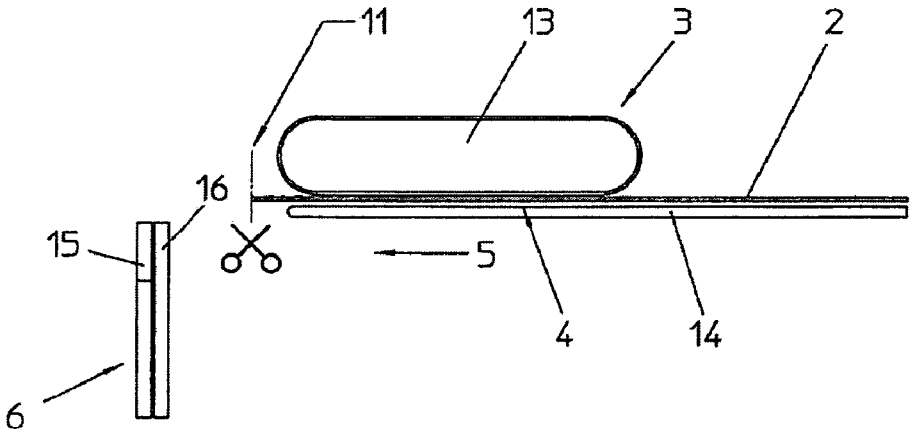


Fig. 12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