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(54) A METHOD AND APPARATUS FOR LOADING AND TRANSFERRING TUBULAR TEXTILE PRODUCTS

VERFAHREN UND VORRICHTUNG ZUM LADEN UND ÜBERTRAGEN ROHRFÖRMIGER
TEXTILPRODUKTE

PROCÉDÉ ET APPAREIL POUR CHARGER ET TRANSFÉRER DES PRODUITS TEXTILES
TUBULAIRES

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Description

[0001] The present invention relates to a method and to a system comprising an apparatus for loading and transferring tubular products on a toe-closer machine and a toe-closer machine. The invention relates to the technical sector of machines and equipment for the production of tights and other hosiery articles, starting from tubular textile products and relates in particular to the loading, cutting and transfer of the tubular products on a toe-closer machine.

[0002] As is known, tights are produced starting from two tubular textile products, identical to one another and each constituting a leg of the tights, and typically involves a toe-closer machine, and a further machine, known as a line-closer, for combining the two legs to form the tights. The toe-closer machine is deputed to the closing of the toes of each of the above-mentioned tubular products, i.e. the toe-tip of each leg of the tights.

[0003] A toe-closer usually comprises a plurality of support tubes on which the tubular products are singly loaded; the machine adapts the open toe of the leg to the curvature that is to be obtained for the sewing and carries out the sewing so as to close the toe, after which the product is unloaded from the support.

[0004] Line-closer machines comprise a carousel structure rotating about a vertical axis and provided with a plurality of supports. The two tubular products destined to make up the tights are loaded on a pair of adjacent supports and, in a successive station of the line-closer, are subjected to a longitudinal cut at a portion which in the finished product constitutes the trunk (or panty and gusset part) and, following this, to sewing so as to join the previously-cut flaps. The sewing of the trunk part between the two legs is typically carried out by a "four-needle" sewing machine; four-needle sewing necessary requires a manual intervention (the known automatic means are not usable on tights that require a four-needle manual sewn seam).

[0005] The toe-closer machine can be positioned upstream of the line-closer (in this case the sewing of the trunk is done on the legs which already have a closed toe) or downstream thereof.

[0006] Examples of line-closer and toe-closer machines are described, for example, in patent documents GB 1501869 A and EP 0126800 A1.

[0007] In the production of low-quality articles and/or articles without portions having particular colours, weft or designs, the cutting of the upper end of the tubular product (which is then joined to the trunk) can be random. In fact, when the tights are uniform it is not important where the cut is made, i.e. it is not necessary to axially orientate the tubular product to make the cut in a particular position. In the same way, for low-cost tights, the cut is done randomly, i.e. in any position of the upper end of the tubular element, and the following step of sewing the toe is completely unconnected to the cutting operation (in substance, the line-closer and toe-closer machines

operate autonomously, in two successive moments, without taking account of the relative position between the cut and the sewing of the toe). In this situation the tubular product can be randomly loaded and the cut can be automatically performed by the machine.

[0008] Instead, with regard to high-quality articles (progressively more in demand in the hosiery market for tights), highly sophisticated articles and articles with graphic figures or patterns or special designs, or a variety of colours or thickness or embellishments, it is important to realise a precise cut of the upper ends of the tubular products; the cut must be done in a specific position of the product (for example perfectly at the centre of the leg) and terminate in a certain point.

[0009] Further, tubular products are provided with a ladderproof portion at which the cut terminates; this prevents, at the end of the cutting line, ladders from developing in the tubular product. Tubular products destined to be loaded and worked automatically are typically provided with a ladderproof portion in a band form all around the tubular product, as the cut is random and it is not possible to know the exact position but only the length thereof. Tubular products for high-quality tights and/or tights provided with particular design graphics are typically provided with a small ladderproof area located exactly at the desired termination for the cutting line of the product. For this reason, the loading of tubular products for high quality tights on the cutting device is done manually, as it is necessary to arrange the product precisely with respect to the cutting device, with the aim of obtaining a cutting line in a determined position on the tubular product.

[0010] The known methods for the production of high-quality tights include first carrying out the step of sewing the tip of the tubular product, and then performing the cut of the opposite end. In greater detail, an operator loads the tubular product on a holder of the toe-closer machine, and the loading is done according to a precise orientation, as the sewing of the tip must have a determined progression (for both aesthetic and comfort reasons when the tights are worn, as well as to reproduce correctly the graphic design of the tights).

[0011] The use of automatic loaders for the toe-closer machine (for example pick and place devices, which collect the tubular products from a container and load them automatically on a holder) is possible only for low-quality articles and/or which do not require a loading with a precision orientation of the tubular product; in fact, pick and place loaders are not able to load with high precision.

[0012] Following the sewing of the tips, the tubular product is unloaded from the toe-closer machine and a further operator loads the product (previously sewn at the tips) onto a cutting holder: this operation is also performed manually as, as mentioned above, the leg of the tight must be precisely positioned so as to be cut along a specific cutting line and with a correct orientation with respect to the sewing line of the toe-tip (for example at an angle of 90°). After the cut, the tubular product is un-

loaded from the cutting holder and sent to a machine for manual sewing, in which the coupling of two tubular products (each being a leg of the tights) is done so as to complete the production of the tights.

[0013] The known methods do not include the making of the cut before the sewing of the toe-tips, as a cut tubular product (at the upper end thereof, opposite the bottom end, which constitutes the toe-tip) no longer has a continuous upper edge (or elastic) since the cutting operation creates two flaps of open textile; the flaps are difficult to manage in the following steps, as they are free to move and make the upper end of the tubular product difficult to associated to a work holder (because the continuous edge is no longer there). For this reason, the toes are usually sewn and then the cutting of the opposite end, then to proceed with the sewing of the trunk part; alternatively the cut can be begun as long as the following step is the sewing of the trunk and the combining of the two legs of the tights, then to conclude with the sewing of both the toe-tips of the tights. In substance, the step of cutting is always followed by the step of sewing the trunk, with the aim of preventing transfers of the tubular products with the cut and open upper end; a transfer of this type would be very difficult, both manually and - even more - automatically, and it would also be difficult to do it while guaranteeing a precise positioning of the tubular product.

[0014] From the above it emerges that the known methods, and the relative machines, for production of high quality articles or articles having graphic patterns or special designs are characterised by a very complex working cycle, which typically requires a large use of personnel. For example, considering that pick and place loaders are typically usable only for low-quality production (which does not require precise positionings of the tubular products), the known methods require three distinct manual operations for the toe sewing, the upper end cutting and the trunk sewing (the assembly of two tubular products to form the tights, with a four-needle sewing). This involves the use of three different operators, with a consequent increase in production costs. Further, the productivity of these methods is necessarily low, as the three manual operations require long times and cannot be parallelized: at the end of each operation the tubular product is unloaded from the machine that has carried out the operation and reloaded manually on the following machine. In particular, the cutting operation constitutes a "bottleneck" in know processes: in fact, the operator waits for the sewing of the toes, removes a sewn tubular product and loads it manually on the cutting holder; then he waits for the cutting operation to finish and proceeds to unloading the cut tubular product from the cutting holder. The next tubular product can then be subjected to cutting only after the preceding tubular product has been unloaded.

[0015] In substance, the Applicant has found that the methods and apparatus of known type are characterised by slow productivity and/or high production costs for the

single pair of tights and/or by significant complexity of the production cycle and/or the means which carry out the cycle. Further, the known production methods and apparatus require large use of personnel, with a consequent increase in times and costs of production.

[0016] The Applicant has also found that the known methods and apparatus are difficult to use for the production of textile articles such as tights, which are of high quality and/or are provided with special graphic patterns, designs, colours and/or weft, and in general cannot be used for realizing tights that require cutting and sewing done with precision in specific portions of tubular products that they are constituted by. Further, a drawback of the methods and apparatus of known type lies in the difficulty of obtaining textile articles, such as tights, having uniform aesthetic and functional characteristics, i.e. in the difficulty of guaranteeing a high repeatability in the production process.

[0017] Other examples of machines are known.

[0018] Patent US5373977 describes an apparatus for transferring a pantyhose article from a Line Close machine to a Toe-Closer machine. A tensioning structure is disposed below the banister of the Line-Closer machine to put in tension the legs of the pantyhose, which hang down from said banister. A retractile tube is connected to an aspirator. Structure is provided to withdraw the elastic hem of the bodice from the forms of the Line-Closer machine by a clamp. Spreading structure is provided to spread apart vertically the bodice of the pantyhose being withdrawn from said forms by two crooks able to be spread apart vertically and which are supported by a carriage horizontally reciprocating in synchronism and in alignment with the clamp. Structure is provided to pick up the bodice of the pantyhose from said crooks and fit it over the tubes of the Toe-Closer machine by turning it inside out.

[0019] Patent US4383491 describes an automatic toe closer having one or more hose carriers, a sewing machine and a clamping means movable for conveying a toe end portion of a hose on a carrier past the sewing machine for toe closing.

[0020] Patent US3793649 describes a process for producing pantyhose wherein the upper portions of two blanks are slit and sewn and then, without turning the entire garment inside out, the garment is slipped over a pair of suction tubes in close proximity to the sewing machine on which the panty portion has been sewed, and suction applied to pull the toe portions through and out of the ends of the tubes in inside-out condition for sewing of the toes which then can be pulled out of the tubes by sliding the leg portions back along the tubes until the toes have been turned to their original position, and then the entire garment slid forwardly off the tubes.

[0021] Patent US5392970 describes a device for turning hosiery items inside out including elements for gripping a hosiery item and moving it along an advancement direction so that the top of the hosiery item is orientated in the advancement direction, and opening elements that

engage the hosiery item and act transversely to the advancement direction to open the top of the hosiery item.

[0022] An aim of the present invention is to obviate one or more of the above-cited drawbacks.

[0023] An aim of the invention is to provide a method and a system comprising an apparatus for loading and transferring tubular textile products on a toe-closer machine which enable realizing textile articles of high quality and substantially without imperfections.

[0024] A further aim of the invention is to provide a method and a system comprising an apparatus for loading and transferring tubular textile products on a toe-closer machine which enable reducing production waste.

[0025] A further aim of the invention is to provide a method and a system comprising an apparatus for loading and transfer of tubular textile products on a toe-closer machine which enable realising the cut and the sewing of tubular products constituting the leg of a pair of tights, guaranteeing a precise positioning and/or orientation both of the sewing line of the toe-tip, in particular for high-quality tights and/or tights provided with portions having special graphic designs and/or various colours and/or wefts.

[0026] A further aim of the invention is to disclose a method and a system comprising an apparatus for loading and transferring tubular textile products on a toe-closer machine which enable reducing the use of personnel for the production of tights, in particular high-quality tights.

[0027] A further aim of the invention is to disclose a method and a system comprising an apparatus for loading and transferring tubular textile products on a toe-closer machine, which enable increasing the productivity and/or reducing the time necessary for the production of tights, in particular high-quality tights.

[0028] A further aim is to disclose a method and a system comprising an apparatus for loading and transferring tubular textile products on a toe-closer machine which enable obtaining highly-uniform production among the various articles produced.

[0029] A further aim of the invention is to disclose a method and a system comprising an apparatus for loading and transferring tubular textile products on a toe-closer machine which enable realising tights in a way that is simple, rapid and/or automatic.

[0030] A further aim of the invention is to provide a system comprising an apparatus for loading and transferring tubular textile products on a toe-closer machine which is simple and/or sturdy and/or economical to realise.

[0031] A further aim of the invention is to provide a system comprising an apparatus for loading and transfer of tubular textile products on a toe-closer machine, usable with existing toe-closer machines and/or integratable in already-existing plants for the production of textile articles.

[0032] These and other aims, which will more fully emerge during the course of the following description,

are substantially attained by a method and a system comprising an apparatus for loading and transferring tubular textile products on a toe-closer machine according to the appended claims, in any combination among them and/or with one or more of the aspects set down in the following.

[0033] In a first aspect the present invention relates to a loading and transferring method of tubular textile products onto a toe-closer machine for production of tights, each of the tubular products extending longitudinally between an upper end and a lower end, both ends being open, the lower end being destined to be sewn by means of a toe-closer machine in order to form the tip of a leg of a pair of tights and the upper end being destined to be cut in order to be subsequently joined to the respective upper end, also cut, of a further tubular product for forming a pair of legs of the tights

[0034] In an aspect, the method comprises steps of:

- predisposing at least a hose loader provided with at least a reference portion;
- at least partially loading a tubular product on the at least a hose loader, externally enveloping the tubular product on the hose loader starting from the upper end, such that a reference position of the tubular product is aligned to, and/or orientated with respect to, and/or corresponds with, the reference portion of the hose loader;
- positioning the hose loader at and/or aligned with a hose holder of a toe-closer machine, in such a way that the reference portion of the hose loader is aligned to, and/or orientated with respect to, and/or corresponds with, a specific portion of the hose holder;
- automatically transferring the tubular product from the hose loader to the hose holder by turning the tubular product inside-out and enveloping the product externally onto the hose holder, while maintaining the respective reference position of the tubular product aligned to, and/or orientated with respect to, and/or corresponding with, the specific portion of the hose holder.

[0035] In an aspect, the loading step of a tubular product onto the at least a hose loader is done manually or automatically, preferably by means of a pick and place device configured and predisposed for picking up a tubular product and for enveloping the product externally on the at least a hose loader, and/or wherein the reference position of the tubular product is a line and/or a band and/or a graphic sign and/or a pattern and/or one or more stop points, the reference position being destined to define a cutting line of the tubular product starting from the upper end thereof or an end of the cutting line.

[0036] In an aspect, during the step of loading the tubular product onto the hose loader the upper end is enveloped on the hose loader and the lower end freely hangs from the hose loader.

[0037] In an aspect, the step of transferring the tubular

product from the hose loader to the hose holder comprises a step of aspirating the portion of tubular product freely hanging from the hose loader, starting from the lower end of the tubular product, internally of an internal cavity of the hose loader or internally of a respective internal cavity of the hose holder of the toe-closer machine.

[0038] In an aspect, the at least a hose loader comprises a support bar and at least a mobile element transversally associated to the support bar such as to operate at least between a retracted position, in which it substantially envelops the support bar, and an advanced position, in which it extends beyond the support bar and defines internally thereof a longitudinal cavity counter-shaped to at least a portion of the hose holder.

[0039] In an aspect, during the loading step - the tubular product is enveloped on the mobile element in the retracted position, and the step of transferring the tubular product from the hose loader to the hose holder comprises a step of bringing the at least a mobile element of the hose loader into the advanced position such that the hose holder of the toe-closer machine inserts at least partially internally of the longitudinal cavity of the mobile element and, consequently, the portion of tubular product previously-loaded on the mobile element is transferred, turned inside-out, onto the hose holder, being enveloped externally thereof

[0040] In an aspect, the step of transferring the tubular product from the hose loader to the hose holder comprises a step of gripping, by means of mobile gripping organs, the portion of tubular product previously loaded on the hose loader, or at least the upper end of the tubular product, unloading such portion from the hose loader and enveloping the tubular product, turned inside-out, externally on the hose holder.

[0041] In an aspect, the method comprises a step of cutting the upper end of the tubular product, preferably at the reference position.

[0042] In an aspect, the step of cutting the tubular product occurs along a cutting line which starts from the upper end and proceeds along, or up to, the reference position of the tubular product having a shape of a line and/or a band and/or a graphic sign and/or a pattern and/or one or more stop points.

[0043] In an aspect, the reference portion of the hose loader houses, enveloped thereon, the portion of tubular product subjected to the cutting step, and/or wherein the cutting step is carried out subsequently to the loading step and/or previously to the transferring step, and/or wherein the cutting step is carried out by means of a cutting device preferably having a blade or using ultrasound or a hot wire, and/or wherein the cutting step comprises a step of selecting and/or regulating a length and/or a shape of the cutting line.

[0044] In an aspect, the loading step is carried out in a loading station, the step of automatically transferring is carried out in a transfer station, distinct and separate from the loading station, and the at least a hose loader, during the positioning step, is moved between the loading

station and the transfer station.

[0045] In an aspect, the cutting step is carried out in the loading station or in the transfer station or during the positioning step and/or in an intermediate position between the loading station and the transfer station.

[0046] In an aspect, when the hose loader is moved from the loading station to the transfer station, a further hose loader is predisposed in the loading station for carrying out a further loading step of a further tubular product.

[0047] In an aspect the method comprises, at an end of the transfer step, a step of returning the at least a hose loader, or a plurality of hose loaders in succession, into the loading station, such as to cyclically repeat the steps of the method on successive tubular products.

[0048] In an aspect, the method comprises a step of predisposing one or more locking plates operatively and movably associated to the mobile element and operable between an open configuration, in which they are externally distanced with respect to the mobile element, and a closed configuration, in which they are neared to the mobile element.

[0049] In an aspect, during the loading step the locking plates are in the open configuration in order to allow loading of the tubular product on the hose loader and are brought into the closed configuration when loading is complete.

[0050] In an aspect, the locking plates are maintained in the closed configuration during and/or successively to the cutting step, such as to maintain two flaps of product created by the cutting step enveloped on the hose loader, and/or wherein during the transfer step the locking plates are returned into the open configuration in order to allow transfer of the tubular product onto the hose loader.

[0051] In an aspect, the method comprises, possibly, a step of selecting or replacing the at least a hose loader, or the mobile element of the hose loader, according to the conformation of the hose holder and/or according to the type of tubular product.

[0052] In an aspect, the method comprises, once transfer is complete, a step of returning the mobile element of the hose loader, without the tubular product, into the retracted position, leaving the product, orientated and/or cut, on the hose holder of the toe-closer machine.

[0053] In an aspect, the method comprises a step of moving the at least a hose loader from the position in which the transfer step is performed to the position in which the loading step is performed, such as to enable loading of a successive tubular product.

[0054] In an aspect, the method comprises a step of completing the transfer of the whole tubular product onto the hose holder, preferably using loading rollers, so that the previously-aspirated portion in the internal cavity of the product hose holder exits from the cavity and is wound externally of the hose holder.

[0055] In an aspect, the method comprises a step of maintaining two flaps of tubular product created by the step of cutting wound on the hose holder of the toe-closer,

by means of one or more pads acting on the hose-holder.

[0056] In an aspect, the method comprises a step of

- sewing, by means of the toe-closer machine, the lower end of the tubular product to the hose holder, in such a way as to close the lower end and realize a toe of a leg of the tights, the sewing of the tip being along a sewing line having a predetermined orientation with respect to the cutting line of the upper end of the tubular product.

[0057] In an aspect, the method comprises a step of combining a pair of tubular products, each subjected to a respective cutting step of each, preferably subjected to a respective sewing step of the tip, and subjecting the pair of tubular products to a line-closer machine for sewing a trunk part and completion of the tights.

[0058] In a further independent aspect, the present invention relates to a system comprising an apparatus for loading and transfer of tubular products on a toe-closer machine for the production of tights, each of the tubular products extending longitudinally between an upper end and a lower end, both open, the lower end being destined to be sewn by a toe-closer machine in order to form the tip of a leg of the tights and the upper end being destined to be cut in order subsequently to be joined to the respective cut upper end of a further tubular product such as to form a pair of legs of a pair of tights.

[0059] In an aspect the apparatus comprises at least a hose loader provided with at least a reference portion and cyclically mobile, by means of movement means, at least between:

- a loading station, configured for and destined to enable at least partial loading of a tubular product on the at least a hose-loader, the tubular product externally enveloping the hose-loader starting from the upper end, such that a reference position of the tubular product is aligned to, and/or orientated with respect to, and/or corresponds with, the reference portion of the hose-loader;
- a transfer station, in which the hose-loader is positioned at and/or is aligned with a hose-holder of a toe-closer machine, in such a way that the reference portion of the hose-loader is aligned to, and/or orientated with respect to, and/or corresponds with, a specific portion of the hose-holder.

[0060] In an aspect the apparatus is configured and predisposed for automatically transferring, at the transfer station, the tubular product from the hose-loader to the hose-holder, by turning the tubular product inside-out and enveloping the product externally of the hose-loader, while maintaining the respective reference position of the tubular product aligned to, and/or orientated with, and/or corresponding with, the specific portion of the hose-holder.

[0061] In an aspect, in the loading station the upper

end of the tubular product is wound on the hose loader and the lower end freely hangs from the hose loader.

[0062] In an aspect, the apparatus comprises aspirating means configured such as to aspirate, at least at the transfer station, the portion of tubular product hanging freely from the hose-loader, starting from the lower end of the tubular product, internally of an internal cavity of the hose-loader.

[0063] In an aspect, the at least a hose loader comprises a support bar and at least a mobile element translatablely associated to the support bar such as to operate at least between a retracted position, in which it substantially envelops the support bar, and an advanced position, in which it extends beyond the support bar and defines internally thereof a longitudinal cavity counter-shaped to at least a portion of the hose holder.

[0064] In an aspect, the apparatus comprises a pusher organ, located at the transfer station, configured such as to cooperate with the mobile element of the hose-loader and cause passage thereof between the retracted configuration and the advanced configuration.

[0065] In an aspect, the passage of the mobile element into the advanced position determines insertion of a hose-loader of the toe-closer machine at least partially internally of the longitudinal cavity of the mobile element and, consequently, a transfer, with an inside-out turning, of the portion of tubular product, previously loaded on the mobile element, onto the hose-holder.

[0066] In an aspect, the mobile element comprises a coupling element configured such as to cooperate, when the hose-loader is positioned in the transfer station, with the pusher organ, such as to receive therefrom a motion necessary for determining the passage of the mobile element between the retracted and advanced configurations.

[0067] In an aspect the mobile element comprises a pair of translatable portions, preferably identical to one another, arranged on opposite sides of the support bar and movable, preferably together, with respect to the support bar in the passage of the mobile element between the retracted and advanced configurations, the translatable portions being each conformed in such a way as to internally define a respective seating counter-shaped to a respective lateral tab of the hose-holder of the toe-closer machine, and to define between them the longitudinal cavity that is complementarily-shaped to the toe-closer machine.

[0068] In an aspect, the apparatus comprises a cutting device configured and predisposed to cut the upper end of the tubular product loaded on the hose-loader along a cutting line.

[0069] In an aspect, the cutting device performs a cutting on the portion of tubular product positioned at the reference position.

[0070] In an aspect, the cutting device is configured such as to select and/or regulate a length and/or a shape of the cutting line.

[0071] In an aspect, the cutting line starts from the up-

per end and proceeds along, or up to, the reference position of the tubular product having a shape of a line and/or a band and/or a graphic sign and/or a pattern and/or one or more stop points.

[0072] In an aspect, the cutting device is configured such as to perform the cutting of the tubular product at the loading station or the transfer station or during the transfer of the hose-loader between the loading station and the transfer station or into an intermediate position between the loading station and the transfer station or at a cutting station, or it is mounted directly onto the hose-loader.

[0073] In an aspect, the hose-loader comprises one or more locking plates operatively and movably associated to the mobile element and operable between an open configuration, in which the locking plates are externally distanced with respect to the mobile element, and a closed configuration, in which they are neared to the mobile element, wherein the locking plates are configured such as to enable, in the open configuration, the loading and/or transfer of the tubular product onto and/or from the hose-loader and, in the closed configuration, such as to maintain two flaps of product created by the cutting device enveloped on the hose-loader.

[0074] In an aspect, the apparatus comprises two or three or four, or a number greater than four, of the hose-loaders, preferably equidistant from one another and cyclically moved at least between the loading station and/or the cutting station and/or the transfer station by means of the movement means.

[0075] In an aspect, the movement means comprise a closed belt, to which the hose-loaders are fixed, and an actuator, the closed belt being moved selectively by means of the actuator, in such a way as to position the hose-loaders of the loading station and/or the cutting station and/or the transfer station according to a predetermined operating cycle.

[0076] In an aspect, the apparatus comprises a set of mobile elements comprising at least two interchangeable different mobile elements for the hose holder and/or a set of hose holders comprising at least two different interchangeable hose holders, each mobile element or each hose holder being complementarily shaped to a specific hose holder of the toe-closer and/or to a specific type of tubular product.

[0077] In a further independent aspect thereof, the present invention relates to a machine for production of tights, comprising an apparatus for loading and transferring tubular products according to any one of the claims and/or the aspects and/or configured and predisposed to implement the method according to any one of the claims and/or aspects, and further comprising a toe-closer machine and/or a line-closer machine.

[0078] In an aspect, the apparatus of the present invention can be a part of, i.e. can be integrated into, a toe-closer machine and/or a line-closer machine.

[0079] Each of the aspects of the invention can be taken alone or in combination with any one of the claims or

the other aspects described.

[0080] Further characteristics and advantages will more fully emerge from the detailed description of a preferred but not exclusive embodiment, according to the accompanying figures, in which:

- figure 1 illustrates a perspective frontal view of a possible embodiment of an apparatus for loading and transfer of tubular products being part of a system according to the present invention, operatively associated to a toe-closer machine for the production of tights;
- figure 2 is a plan view, from above, of the apparatus and the toe-closer machine of figure 1;
- figure 3 illustrates a perspective rear view of the apparatus and the toe-closer machine 1;
- figure 4 is a frontal perspective view in larger scale of a portion of the apparatus and the toe-closer machine of figure 1;
- figure 5 is a lateral view of a portion of the apparatus and the toe-closer machine of figure 1;
- figure 6 is a perspective view from above of a portion of the apparatus and the toe-closer machine of figure 1;
- figure 7 is a front view of a portion of an apparatus for loading and transfer of tubular products being part of a system according to the present invention;
- figure 8 is a perspective view of the apparatus for loading and transfer of tubular products being part of a system according to the present invention.

[0081] With reference to the figures, 1 denotes in its entirety an apparatus for loading and transfer of tubular products being part of a system according to the present invention, while 50 denotes in its entirety a toe-closer machine, for example of known type.

[0082] The apparatus of the system of the present invention is configured to operate on tubular textile machines, in particular for tubular products typically used for the production of tights and each destined to constitute a leg of a pair of tights. By way of example, each tubular product extends longitudinally between an upper end and a lower end, both open: the lower end is destined to be sewn by a toe-closer machine 50 for forming the tip of a leg of the tights, while the upper end is destined to be cut, then to be joined at the respective cut upper end to the respective cut upper end of a further tubular product for forming a pair of legs of the tights.

[0083] The apparatus 1 comprises at least a hose loader 2 provided with at least a reference portion 3 and cyclically mobile, by movement means 40, at least among:

- a loading station 11, configured for and destined to enable at least partial loading of a tubular product on the at least a hose-loader 2, the tubular product externally enveloping the hose-loader 2 starting from the upper end, such that a reference position of the tubular product is aligned to, and/or orientated with

respect to, and/or corresponds with, the reference portion 3 of the hose-loader 2;

- a transfer station 12, in which the hose-loader 2 is positioned at and/or is aligned with a hose-holder 51 of a toe-closer machine 50, in such a way that the reference portion 3 of the hose-loader 2 is aligned to, and/or orientated with respect to, and/or corresponds with, a specific portion of the hose-holder 51.

[0084] The apparatus 1 is structured for automatically transferring, at the transfer station 12, the tubular product from the hose-loader 2 to the hose-holder 51, by turning the tubular product inside-out and enveloping the product externally of the hose-holder, while maintaining the respective reference position of the tubular product aligned to, and/or orientated with, and/or corresponding with, the specific portion of the hose-holder 51.

[0085] The apparatus comprises a frame 1a to which the movement means 40 are associated to the movement means 40 are associated, which support and move the hose-loaders 2. As shown by way of example in the figures, the frame comprises a support structure and a command panel which controls the functioning of the whole apparatus.

[0086] In the loading station 11, the upper end of the tubular product is preferably enveloped on the hose loader 2 and the lower end hangs freely from the hose loader. In a possible embodiment that is not illustrated, the apparatus preferably comprises aspirating means able to aspirate, at least at the transfer station, the portion of tubular product hanging freely from the hose loader, starting from the lower end of the tubular product, internally of an internal cavity of the hose loader. In this way the lower end of the product will not interfere with elements of the apparatus or the toe-closer machine and further the tubular product is predisposed for the following transfer step on the holder of the toe-closer.

[0087] The hose loader 2 preferably comprises a support bar 5 and at least a mobile element 6 translatable associated to the support bar and operable at least between a retracted position, in which it surrounds the support bar, and an advanced position, in which it extends beyond the support bar and defines internally thereof a longitudinal cavity 4 counter-shaped to at least a portion of the hose-holder.

[0088] As shown by way of example the figures, the passage between the retracted position and the advanced position, and vice versa, is done by means of a to and fro translation of the mobile element along a longitudinal development direction of the hose loader.

[0089] The apparatus preferably comprises a pusher organ 15, located at the transfer station 12, configured such as to cooperate with the mobile element 6 of the hose-loader 2 and cause passage thereof between the retracted configuration and the advanced configuration. The passage of the mobile element 6 into the advanced position preferably determines insertion of a hose-loader 51 of the toe-closer machine 50 at least partially internally

of the longitudinal cavity 4 of the mobile element 6 and, consequently, a transfer, with a tilting, of the portion of tubular product, previously loaded on the mobile element 6, onto the hose-holder.

[0090] The mobile element 6 preferably comprises (solidly constrained thereto) a coupling element 16 configured such as to cooperate, when the hose-loader 51 is positioned in the transfer station 12, with the pusher organ 15, such as to receive therefrom a motion necessary for determining the passage of the mobile element between the retracted and advanced configurations.

[0091] In the embodiment illustrated in the figures, the pushing organ consists of a linear actuator, for example a pneumatic cylinder, associated to the frame 1a of the apparatus 1 at the transfer station.

[0092] The pushing organ preferably comprises a fixed part 15a mounted to the frame 1a and a mobile part 15b (or stem) translatable in advancement and retraction with respect to the fixed part. The pusher organ 15 is positioned in such a way that when the hose loader 2 reaches the transfer station the coupling element 16 of the hose loader 2 is perfectly aligned with the pusher organ: in this situation, the mobile part 15b - when it exits from the fixed part 15a - encounters the coupling element 16 and connects to it, transferring the advancement motion to it and drawing it towards the advanced configuration. In this way, the hose-loader 2 reaches the hose-holder 51 of the toe-closer machine and envelops it externally.

[0093] Considering that the tubular product is enveloped with the upper end thereof externally of the mobile element 6 of the hose loader, the inlet of the hose holder 51 internally of the cavity 4 of the mobile element (into which the remaining portion of tubular product not enveloped externally of the hose-loader 2 is preferably aspirated) causes a push on the part of the hose-holder 51 on the tubular product, which is transferred, inside-out with respect to the loading step, externally of the hose-holder. The transfer with the present apparatus 1 enables maintaining the orientation of the tubular product unvaried between the hose-loader 2 and the hose-holder 51.

[0094] The mobile element 6 preferably comprises a pair of translatable portions 7, preferably identical to one another, arranged on opposite sides of the support bar 5 and movable, preferably together, with respect to the support bar in the passage of the mobile element between the retracted and advanced configurations.

[0095] As shown in the figures, the two translatable portions 7 are preferably located on two opposite sides of the support bar 5 (substantially one above and one below the bar) and are connected and solidly constrained by means of two connecting plates, preferably one on each of the two sides of the support bar.

[0096] One of the connecting plates preferably bears the coupling element 16: in this way the pusher organ acts on the coupling element and then draws the whole mobile element 6 (preferably comprising two portions 7).

[0097] The translatable portions 7 are preferably conformed each in such a way as to internally define a re-

spective seating 7a counter-shaped to a respective lateral tab 53 of the hose-holder 51 of the toe-closer machine 50, and such as to define between them the longitudinal cavity 4 counter-shaped to a central tube 52 of the hose-holder 51 of the toe-closer machine.

[0098] The hose-loaders 2 of the apparatus of the present invention are structured in such a way as to co-operate correctly with hose holders 51 typically used in toe-closer machines: the toe-holders usually comprise a central tube 52, about which the tubular product to be toe-stitched is wound, and possibly a pair of lateral tabs which stretch the tubular product wound on the hose holder 51 to the sides of the central tube, so as to facilitate the sewing operation of the toe-tip. For this reason, the translating portions 7 of the mobile element 6 of the hose-loader 2 are provided with seatings 7a specially conformed to enable insertion of the tabs 53 of a hose-holder 51.

[0099] The hose-loader 2 is further preferably positionable by movement means 40 in a cutting station 13, in which a cutting operation of the upper end of the tubular product is made (the end being destined to be joined by a trunk to the other leg of the tights). For this purpose, the apparatus can comprise a cutting device 30 configured to cut the upper end of the tubular product loaded on the hose-loader along a cutting line. In figures 7 and 8, which show only the apparatus 1, a cutting device 30 is schematically represented (in itself of known type in the sector and therefore not described in greater detail).

[0100] The cutting device 30 preferably performs the cut on the portion of tubular product at the reference position. The cutting line preferably starts from the upper end of the tubular product and proceeds along, or up to, the reference position having a shape of a line and/or a band and/or a graphic sign and/or a weft and/or one or more halt points. The cutting device 30 can perform the cut of the tubular product at the hose loader 11 or the transfer station or during the transfer of the hose loader between the loading station and the transfer station or in an intermediate position between the loading station and the transfer station. As shown in the figures, the cutting device preferably carries out the cut at the cutting station 13. Each hose loader can also be provided with a cutting device of its own mounted directly on it and mobile, among the various stations, solidly in constraint with it. In this way the cut can be made without halting the motion of the hose loaded between the various stations.

[0101] The cutting device can be of the blade or ultrasound or hotwire type.

[0102] As shown by way of example in the figures, the reference portion 3 of the hose loader 2 preferably consists in a straight gully on an external surface of the hose loader (the surface is preferably facing upwards when the hose loader 2 is in the loading station). The gully is preferably configured so as to receive a cutting blade (or equivalent means) and enable the cut of the portion of tubular product superposed to the gully. In substance,

the gully functions as an abutment, or guide, for a cutting blade: the portion of tubular product, enveloped on the hose loader, which is interposed between the gully and the cutting blade is cut. The extension of the reference portion (i.e. the gully) and/or the trajectory of the cut carried out by the cutting device define the shape and/or the length of the cutting line of the tubular product.

[0103] The hose loader 2 preferably comprises one or more blocking plates 8 operatively and movably associated to the mobile element 6 and operable between an open configuration, in which they are distanced externally with respect to an open configuration and a closed configuration, in which they are neared to the mobile element. The blocking plates 8 enable, in the open configuration, the loading and/or transfer of the tubular product on and/or from the hose loader while, in the closed configuration, they maintain the two flaps of product created by the cutting device enveloped on the hose loader. The hose loader can preferably comprise two blocking plates, one for each side of the mobile element. Still more preferably, as shown in the figures, the hose loader 2 comprises two pairs of blocking plates 8 (for a total of four plates), a pair for each side of the hose loader. In more detail, each side of the hose loader comprises a blocking plate for each of the two translatable portions 7.

[0104] The blocking plates are preferably movable between the respective open and closed configurations by means of appropriate actuators, for example of pneumatic or electrical type. All the blocking plates of a hose loader are preferably moved to open and close together, i.e. simultaneously (for example by means of a single actuator active on all the blocking plates of the loader). This means that (typically in the loading station and so as to complete the transfer), the blocking plates are all brought into the open configuration so as to enable loading and transfer of the tubular product, while with the loading completed and up to the transfer onto the toe-closer, the blocking plates maintain the tubular product correctly and stably enveloped on the hose loader, in particular during and after the cutting operation; the blocking plates prevent the tubular product loaded on the hose loader from becoming dealigned and/or losing the original orientation received during the loading step, which orientation is to be conserved up to the transfer onto the toe-closer machine.

[0105] The apparatus 1 preferably comprises two or three or four, or a number greater than four, of the hose loaders 2; in the embodiment shown in the figures, the apparatus comprises four distinct hose loaders 2. This enables arranging a number hose loaders greater than the number of stations (loading 11, cutting 13 and transfer 12) and therefore enables the operations to be "parallelized": in fact, following the loading of a tubular product on a first hose loader, it is not necessary to wait for the holder to complete the cycle and return available to the starting point, although a second hose loader is immediately available (i.e. free of tubular products and not engaged in any station) and arrives in the loading station

to receive a further tubular product. At working speed each hose loader of the apparatus substantially passes through successive operating stations and at least one of the loaders is always available, with a short waiting time for the operation who does the initial loading. Imagining a photograph of the state of the apparatus at a given instant (as shown by way of example in figure 7), a hose loader can be seen in the loading station, a further holder in the cutting station, a further holder in the transfer station and a further holder about to return to the initial loading station (observe figures 7 and 8 for this).

[0106] It is obviously possible to increase the number of hose loaders of the apparatus and the distance between the stations: the greater the number of holders, the greater the number of tubular products contemporaneously working in the apparatus. The hose loaders 2 are preferably equidistant and cyclically moved at least between the above-mentioned loading and/or cutting and/or transfer stations by means of the movement means 40. The movement means 40 preferably comprise a closed belt 41 (or a chain or a conveyor belt or the like) to which the hose loaders are fixed, and an actuator (not shown), for example comprising an electric motor and a drive pulley, activated by the electric motor, on which the belt 41 is mounted. The closed belt 41 is moved selectively by means of being advanced in such a way as to position the hose loader in the loading and/or cutting and/or transfer stations in a predetermined operating cycle. The movement means are configured so as to move the hose loaders between the various stations by means of continuous motion, with selectable velocity, or discontinuously, providing on need one or more paused, for example at the loading and/or cutting and/or transfer stations.

[0107] In the embodiment of the figures, the movement means are configuration so as to move the hose loaders in horizontal trajectories, an outward trajectory (from the loading station to the transfer station) and an opposite return station, connected by two tracts of circular connections. However, according to needs (for example taking account of ergonomic criteria), the movement of the hose loaders can take place along inclined trajectories, i.e. the position of the different stations of the apparatus is on different levels (for example, for the sake of ease of operation, the loading station and the transfer station can be vertically dealigned, with the loading station in a lower position so as to facilitate the enveloping of the tubular product on the hose loader by an operator.

[0108] Overall the figures (in particular figures 4, 5, 6, 7 and 8) show the various positions and configurations assumed by the hose loaders of the apparatus during an operating cycle and further show the reciprocal position assumed by a hose loader of the apparatus and a hose holder of the toe-closer machine in the transfer station 12.

[0109] In this station, the hose loader 2 is positioned perfectly aligned and headed with the hose holder 51 of the toe-closer machine. Note that in figure 7 the hose loader in the loading station is slightly inclined with re-

spect to the vertical, in such a way as to correspond with the inclination the hose holder of the toe-closer machine at the same point (i.e. the meeting point between the holders of the apparatus and the toe-closer where the transfer takes place).

[0110] In the figures it can also be seen how the hose loader 2 in the transfer station has the respective mobile element 6 in an advanced configuration (by means of the action of the pusher organ 15), with the aim of enabling transfer to the hose holder of the toe-closer, while the remaining hose loaders 2 are in the retracted configuration, enabling the loading and/or the cutting of the tubular product (see figures 7 and 8 in this regard).

[0111] The above-described apparatus is particular, though not exclusively, suitable for implementing the method for loading and transferring the tubular products on a toe-closer machine for the production of tights of the present invention.

[0112] As described above, and clearly illustrated in the figures, the method comprises steps of:

- predisposing at least a hose loader 2 provided with at least a reference portion 3;
- at least partially loading a tubular product on the at least a hose loader 2, externally enveloping the tubular product on the hose loader starting from the upper end, such that a reference position of the tubular product is aligned to, and/or orientated with respect to, and/or corresponds with, the reference portion 3 of the hose loader 2;
- positioning the hose loader 2 at and/or aligned with a hose holder 51 of a toe-closer machine 50, in such a way that the reference portion 3 of the hose loader 2 is aligned to, and/or orientated with respect to, and/or corresponds with, a specific portion of the hose holder 51;
- automatically transferring the tubular product from the hose loader 2 to the hose holder 51 by turning the tubular product inside-out and enveloping the product externally onto the hose holder, while maintaining the respective reference position of the tubular product aligned to, and/or orientated with respect to, and/or corresponding with, the specific portion of the hose holder.

[0113] The loading step is preferably carried out in the above-mentioned loading station 11, the step of automatically transferring is carried out in a transfer station 12, distinct and separate from the loading station 11, and the hose loader 2, during the positioning step, is moved between the loading station 11 and the transfer station 12. The cutting step is preferably carried out in the loading station 11 or in the transfer station 11 or during the positioning step or in an intermediate position between the loading station and the transfer station.

[0114] As shown by way of example in figures 7 and 8, the cutting step is carried out in a specific cutting station 13.

[0115] When a hose loader 2 is moved from the loading station to the transfer station, a further hose loader 2 is preferably predisposed in the loading station 11 for carrying out a further loading step of a further tubular product.

[0116] The method preferably comprises, at an end of the transfer step, a step of returning the at least a hose loader 2, or a plurality of hose loaders 2 in succession, into the loading station 11, such as to cyclically repeat the steps of the method on successive tubular products.

[0117] The method preferably comprises a step of completion of the transfer of the whole tubular product onto the hose holder 51, preferably by means of loading rollers 55 (see figures 2, 3, 5, 6), such that the previously-aspirated portion in the internal cavity of the hose holder exits from the cavity and is wound externally of the hose holder.

[0118] In an aspect, the method comprises a step of sewing, by means of the toe-closer machine 50, the lower end of the tubular product wound to the hose holder, in such a way as to close the lower end and realize the toe-tip of a leg of the tights. Using the present method and apparatus, and thanks to the maintaining of a precise orientation unchanged from the loading on the hose loader to the transfer onto the hose holder, the sewing of the toe of each tubular product is carried out along a sewing line having a predetermined orientation (for example 90°) with respect to the cutting line of the upper end of the tubular product.

[0119] The sewing machine (not illustrated) of the toe-closer can be a machine of the overlock cut-and-sew type, for example a machine of the type produced by UNION SPECIAL ® in one of series 9M or the like.

[0120] Various aspects of the method, corresponding to the further aspects described above and/or actuable using above-illustrated components of the apparatus, are not repeated here. The further aspects of the production process of tights, for example relating to toe-closer and line-closer machines not described in detail in the present description and not deriving from special characteristics of the apparatus as described in the foregoing, are understood to be of conventional type.

[0121] The invention as it is conceived is susceptible to numerous modifications and variants, all falling within the inventive concept and the cited components are replaceable by other technically-equivalent element.

[0122] The invention offers important advantages.

[0123] Firstly, the invention enables obviating at least some of the drawbacks of the prior art. The invention further enables automatically producing tights of high quality and/or provided with particular graphic designs, wefts or designs and/or, in general, requiring a cut and sew having a determined orientation and/or position.

[0124] The invention further enables realizing textile articles, in particular tights, with high precision and/or substantially free of imperfections and/or reducing production waste.

[0125] The invention further enables automatically

transferring a tubular product, already subjected to a cutting operation of the upper end, to a toe-closer machine for sewing the toe-tips.

[0126] The invention further enables realizing a continuous automatic cycle comprising the loading and cutting of tubular products and the transfer thereof on a toe-closer machine in a completely automatic way, without any intermediate unloading and with a single apparatus.

[0127] The invention further provides a method and a relative system in which a tubular product is initially loaded with a determined orientation and/or positioning and the orientation and/or positioning are maintained unchanged along all the successive stations up to the passage to a successive toe-closer machine, on which they are transferred while maintaining unchanged the said orientation and/or positioning.

[0128] Further, within the production cycle of tights, the invention anticipates the cutting operation of the tubular products upstream of the closing operations of the toes and sewing of the trunk.

[0129] The invention also enables increasing the velocity of execution of the cutting and/or transfer and/or sewing operations of tubular products for tights, and in general increasing the velocity of the whole production cycle, and thus increasing productivity.

[0130] The invention further enables improving the quality and/or obtaining productions of great uniformity among the various tights produced.

[0131] The invention further enables simplifying the production process of tights with respect to the known methods. The invention further enables reducing the need for personnel (one only or even no operator is required) with respect to the known methods.

[0132] The invention further obviates unloading of tubular products from the cutter holders and the successive manual re-loading on the toe-closer machine holders, typically required in the known methods and apparatus.

[0133] The invention further enables parallelising the cutting and sewing operations of tubular products for tights, reducing the dead times and enabling loading in succession a plurality of tubular products without having to wait for the completion of the production cycle.

[0134] The invention further facilitates the initial loading of tubular products on a machine for production of tights and/or improving the ergonomics of the loading.

[0135] The invention further enables realizing loading and transfer of tubular products on a toe-closer machine in a simple, rapid and automatic way, in particular also by integrating the apparatus described in an automatic machine for assembly of textile articles of known type.

[0136] Furthermore, the system of the present invention is simple and/or sturdy and/or economic to realize.

Claims

1. A loading and transferring method of tubular textile products onto a toe-closer machine (50) for produc-

tion of tights, each of said tubular products extending longitudinally between an upper end and a lower end, both ends being open, the lower end being destined to be sewn by means of the toe-closer machine in order to form the tip of a leg of a pair of tights and the upper end being destined to be cut in order to be subsequently joined to the respective upper end, also cut, of a further tubular product for forming a pair of legs of the tights, the method being **characterized in that** it comprises the steps of:

- predisposing at least a toe-closer machine (50), provided with at least a hose holder (51);
- predisposing at least a hose loader (2) provided with at least a reference portion (3);
- at least partially loading a tubular product on said at least a hose loader (2), externally enveloping the tubular product on the hose loader starting from said upper end, such that a reference position of the tubular product is aligned to, or orientated with respect to, or corresponds with, said reference portion (3) of said hose loader (2);
- positioning said hose loader (2) at or aligned with the hose holder (51) of the toe-closer machine (50), in such a way that the reference portion (3) of the hose loader (2) is aligned to, or orientated with respect to, or corresponds with, a specific portion of said hose holder (51);
- automatically transferring said tubular product from said hose loader (2) to said hose holder (51) by turning the tubular product inside-out and enveloping the product externally onto said hose holder, while maintaining said respective reference position of the tubular product aligned to, or orientated with respect to, or corresponding with, said specific portion of said hose holder,

wherein said at least a hose loader (2) comprises a support bar (5) and at least a mobile element (6) translatably associated to the support bar (5) such as to operate at least between a retracted position, in which it substantially envelops said support bar (5), and an advanced position, in which it extends beyond the support bar (5) and defines internally thereof a longitudinal cavity (4) counter-shaped to at least a portion of said hose holder (51), in which - during said loading step - the tubular product is enveloped on said mobile element (6) in said retracted position, and said step of transferring the tubular product from the hose loader (2) to the hose holder (51) comprises a step of bringing said at least a mobile element (6) of the hose loader (51) into said advanced position such that the hose holder (51) of the toe-closer machine (50) inserts at least partially internally of the longitudinal cavity (4) of the mobile element (6) and, consequently, the portion of tubular product previously-loaded on the mobile element (6)

is transferred, turned inside-out, onto the hose holder (51), being enveloped externally thereof, and wherein the method comprises a step of cutting the upper end of the tubular product, preferably at said reference position, and wherein said step of cutting the tubular product occurs along a cutting line which starts from the upper end and proceeds along, or up to, said reference position of the tubular product having a shape of a line or a band or a graphic sign or a pattern or one or more stop points.

2. The method of the preceding claim, wherein said loading step of a tubular product onto said at least a hose loader (2) is done manually or automatically, preferably by means of a pick and place device configured and predisposed for picking up a tubular product and for enveloping the product externally on said at least a hose loader (2).
3. The method of claim 1 or 2, wherein said reference position of the tubular product is a line or a band or a graphic sign or a pattern or one or more stop points, said reference position being destined to define said cutting line of the tubular product starting from the upper end thereof or an end of the cutting line, and wherein during said step of loading the tubular product onto the hose loader (2) the upper end is enveloped on the hose loader (2) and the lower end freely hangs from said hose loader (2), or wherein said step of transferring the tubular product from said hose loader (2) to said hose holder (51) comprises a step of aspirating the portion of tubular product freely hanging from the hose loader (2), starting from the lower end of the tubular product, internally of an internal cavity of the hose loader (2) or internally of a respective internal cavity of the hose holder (51) of the toe-closer machine (50).
4. The method of any one of the preceding claims, wherein said step of transferring the tubular product from the hose loader (2) to the hose holder (51) comprises a step of gripping, by means of mobile gripping organs, the portion of tubular product previously loaded on the hose loader (2), or at least the upper end of the tubular product, unloading such portion from the hose loader (2) and enveloping the tubular product, turned inside-out, externally on the hose holder (51).
5. The method of any one of the preceding claims, wherein said reference portion (3) of the hose loader (2) houses, enveloped thereon, the portion of tubular product subjected to the cutting step, and wherein the cutting step is carried out subsequently to the loading step or previously to the transferring step, and wherein the cutting step is carried out by means of a cutting device (30) preferably having a blade or using ultrasound or a hot wire, and wherein the cut-

ting step comprises a step of selecting or regulating a length and/or a shape of said cutting line.

6. The method of any one of the preceding claims, wherein said loading step is carried out in a loading station (11), said step of automatically transferring is carried out in a transfer station (12), distinct and separate from said loading station (11), and said at least a hose loader (2), during said positioning step, is moved between said loading station (11) and said transfer station (12), and wherein said cutting step is carried out in the loading station (11) or in the transfer station (11) or during the positioning step or in an intermediate position between said loading station (11) and said transfer station (12) or in a cutting station (13).
7. The method of the preceding claim, wherein when said hose loader (2) is moved from said loading station (11) to said transfer station (12), a further hose loader (2) is predisposed in said loading station (11) for carrying out a further loading step of a further tubular product.
8. The method of claim 6, comprising, at an end of the transfer step, a step of returning said at least a hose loader (2), or a plurality of hose loaders (2) in succession, into said loading station (11), such as to cyclically repeat the steps of the method on successive tubular products.
9. The method of any one of the preceding claims, further comprising one or more of following steps:
 - predisposing one or more locking plates (8) operatively and movably associated to said mobile element (6) and operable between an open configuration, in which they are externally distanced with respect to the mobile element (6), and a closed configuration, in which they are neared to the mobile element (6), in which during the loading step the locking plates (8) are in the open configuration in order to allow loading of the tubular product on the hose loader (2) and are brought into the closed configuration when loading is complete, and wherein the locking plates (8) are maintained in the closed configuration during or successively to the cutting step, such as to maintain two flaps of product created by the cutting step enveloped on the hose loader (2), and wherein during the transfer step the locking plates (8) are returned into the open configuration in order to allow transfer of the tubular product onto the hose loader (51);
 - possibly, selecting or replacing said at least a hose loader (2), or said mobile element (6) of the hose loader (2), according to the conformation of the hose holder (51) or according to the

type of tubular product;

- on completion of transfer, returning said mobile element (6) of the hose loader (2), without the tubular product, into said retracted position, leaving the product, orientated or cut, on the hose holder (51) of the toe-closer machine (50);
- following said transfer step, moving said at least a hose loader (2) from the position in which the transfer step is performed to the position in which the loading step is performed, such as to enable loading of a successive tubular product.

10. A system comprising an apparatus (1) for loading and transferring tubular textile products on a toe-closer machine (50) and a toe-closer machine (50), for producing tights, each of the tubular products extending longitudinally between an upper end and a lower end, both open, the lower end being destined to be sewn by the toe-closer machine (50) in order to form the tip of a leg of the tights and the upper end being destined to be cut in order subsequently to be joined to the respective cut upper end of a further tubular product such as to form a pair of legs of a pair of tights, the system being **characterized in that** the apparatus comprises at least a hose loader (2) provided with at least a reference portion (3) and cyclically mobile, by means of movement means (40), at least between:

- a loading station (11), configured for and destined to enable at least partial loading of a tubular product on said at least a hose-loader (2), the tubular product externally enveloping the hose-loader (2) starting from said upper end, such that a reference position of the tubular product is aligned to, or orientated with respect to, or corresponds with, said reference portion (3) of the hose-loader (2);
- a transfer station (12), in which said hose-loader (2) is positioned at or is aligned with a hose-holder (51) of the toe-closer machine (50), in such a way that the reference portion (3) of the hose-loader (2) is aligned to, or orientated with respect to, or corresponds with, a specific portion of said hose-holder (51);

wherein said apparatus (1) is configured and predisposed for automatically transferring, at said transfer station (12), the tubular product from the hose-loader (2) to the hose-holder (51), by turning the tubular product inside-out and enveloping the product externally of said hose-holder (51), while maintaining said respective reference position of the tubular product aligned to, or orientated with, or corresponding with, said specific portion of the hose-holder (51), wherein said at least a hose-loader (2) comprises a support bar (5) and at least a mobile element (6) translatably associated to the support bar (5) and

configured such as to operate at least between a retracted position, in which it substantially surrounds said support bar (5), and an advanced position, in which it extends beyond the support bar (5) and defines internally thereof a longitudinal cavity (4) counter-shaped to at least a portion of said hose-holder (51), and wherein said apparatus comprises a pusher organ (15), located at said transfer station (12), configured such as to cooperate with the mobile element (6) of the hose-loader (2) and cause passage thereof between said retracted configuration and said advanced configuration, and wherein the passage of the mobile element (6) into said advanced position determines insertion of the hose-loader (51) of the toe-closer machine (50) at least partially internally of the longitudinal cavity (4) of said mobile element (6) and, consequently, a transfer, with an inside-out turning, of the portion of tubular product, previously loaded on the mobile element (6), onto the hose-holder (51), wherein said mobile element (6) comprises a pair of translatable portions (7), preferably identical to one another, arranged on opposite sides of the support bar (5) and movable, preferably together, with respect to the support bar (5) in the passage of the mobile element (6) between the retracted and advanced configurations, said translatable portions (7) being each conformed in such a way as to internally define a respective seating (7a) counter-shaped to a respective lateral tab (53) of the hose-holder (51) of the toe-closer machine (50), and such as to define between them said longitudinal cavity (4) counter-shaped to a central tube (52) of said hose-holder (51), wherein the apparatus (1) comprises aspirating means configured such as to aspirate, at least at said transfer station (12), the portion of tubular product hanging freely from the hose-loader (2), starting from the lower end of the tubular product, internally of an internal cavity of the hose-loader (2), and wherein the apparatus (1) comprises a cutting device (30) configured and predisposed to cut the upper end of the tubular product loaded on said hose-loader (2) along a cutting line, and wherein the cutting device (30) performs a cutting on the portion of tubular product positioned at said reference position, and wherein said cutting line starts from the upper end and proceeds along, or up to, said reference position of the tubular product having a shape of a line or a band or a graphic sign or a pattern or one or more stop points.

11. The system of the preceding claim, wherein said mobile element (6) comprises a coupling element (16) configured such as to cooperate, when the hose-loader (51) is positioned in said transfer station (12), with said pusher organ (15), such as to receive therefrom a motion necessary for determining the pas-

sage of the mobile element (6) between the retracted and advanced configurations.

12. The system of claim 10 or 11, wherein the cutting device (30) is configured such as to perform the cutting of the tubular product at the loading station (11) or the transfer station (12) or during the transfer of the hose-loader between the loading station (11) and the transfer station (12) or into an intermediate position between the loading station (11) and the transfer station (12) or at a cutting station (13), or it is mounted directly onto said hose-loader (2).
13. The system of any one of claims from 10 to 12, wherein said hose-loader (2) comprises one or more locking plates (8) operatively and movably associated to said mobile element (6) and operable between an open configuration, in which the locking plates (8) are externally distanced with respect to the mobile element (6), and a closed configuration, in which they are neared to the mobile element (6), wherein the locking plates (8) are configured such as to enable, in the open configuration, the loading and transfer of the tubular product onto and from the hose-loader (2) and, in the closed configuration, such as to maintain two flaps of product created by the cutting device (30) enveloped on the hose-loader (2).
14. The system of any one of claims from 12 to 13, wherein the apparatus (1) comprises two or three or four, or a number greater than four, of said hose-loaders (2), preferably equidistant from one another and cyclically moved at least between the loading station (11) and cutting station (13) and transfer station (12) by means of said movement means (40).
15. The system of any one of claims from 12 to 14, wherein said movement means (40) comprise a closed belt (41), to which the hose-loaders (2) are fixed, and an actuator, said closed belt (41) being moved selectively by means of said actuator, in such a way as to position the hose-loaders (2) of the loading station (11) and the cutting station (13) and the transfer station (12) according to a predetermined operating cycle.

Patentansprüche

1. Verfahren zum Laden und Transferieren von röhrenförmigen Textilprodukten auf eine Fußspitzenschließmaschine (50) zur Produktion von Strumpfhosen, wobei sich jedes der röhrenförmigen Produkte longitudinal zwischen einem oberen Ende und einem unteren Ende erstreckt, wobei beide Enden geöffnet sind, wobei das untere Ende dazu bestimmt ist, mittels der Fußspitzenschließmaschine vernäht zu werden, um die Spitze eines Beines einer

Strumpfhose auszubilden und das obere Ende dazu bestimmt ist, geschnitten zu werden, um anschließend mit dem jeweiligen ebenfalls geschnittenen oberen Ende eines weiteren röhrenförmigen Produktes zum Bilden eines Paares von Beinen der Strumpfhose verbunden zu werden, wobei das Verfahren **dadurch gekennzeichnet ist, dass** es die folgenden Schritte umfasst:

- Prädisponieren wenigstens einer Fußspitzenschließmaschine (50), welche mit wenigstens einem Schlauchhalter (51) bereitgestellt ist;
- Prädisponieren wenigstens einer Schlauchladeeinrichtung (2), welche mit wenigstens einem Referenzabschnitt (3) bereitgestellt ist;
- Wenigstens teilweises Laden eines röhrenförmigen Produktes auf die wenigstens eine Schlauchladeeinrichtung (2), das röhrenförmige Produkt außen an der Schlauchladeeinrichtung ausgehend von dem oberen Ende derart umhüllend, dass eine Referenzposition des röhrenförmigen Produktes mit dem Referenzabschnitt (3) der Schlauchladeeinrichtung (2) ausgerichtet ist oder in Bezug auf diesen orientiert ist oder diesem entspricht;
- Positionieren der Schlauchladeeinrichtung (2) an oder ausgerichtet mit dem Schlauchhalter (51) der Fußspitzenschließmaschine (50) in einer Weise, dass der Referenzabschnitt (3) der Schlauchladeeinrichtung (2) mit einem spezifischen Abschnitt des Schlauchhalters (51) ausgerichtet ist oder in Bezug auf diesen orientiert ist oder diesem entspricht;
- Automatisches Transferieren des röhrenförmigen Produktes von der Schlauchladeeinrichtung (2) auf den Schlauchhalter (51) durch Wenden einer Innenseite des röhrenförmigen Produktes nach außen und durch Umhüllen des Produktes außen auf den Schlauchhalter, während die jeweilige Referenzposition des röhrenförmigen Produktes aufrechterhalten wird, welche mit dem spezifischen Abschnitt des Schlauchhalters (51) ausgerichtet ist oder in Bezug auf diesen orientiert ist oder diesem entspricht;
- wobei die wenigstens eine Schlauchladeeinrichtung (2) einen Haltestab (5) und wenigstens ein bewegliches Element (6) umfasst, welches dem Haltestab (5) verschiebbar zugeordnet ist, um wenigstens zwischen einer eingefahrenen Position, in welcher es den Haltestab (5) im Wesentlichen umhüllt, und einer ausgefahrenen Position zu wirken, in welcher es sich über den Haltestab (5) hinaus erstreckt und innerhalb davon einen longitudinalen Hohlraum (4) definiert, welcher gegengeformt zu wenigstens einem Abschnitt des Schlauchhalters (51) ist, wobei - während des Ladeschritts - das röhrenförmige

Produkt an dem beweglichen Element (6) in der eingefahrenen Position umhüllt ist, und der Schritt des Transferierens des schlauchförmigen Produktes von der Schlauchladeeinrichtung (2) auf den Schlauchhalter (51) einen Schritt eines Bringens des wenigstens einen beweglichen Elements (6) der Schlauchladeeinrichtung (51) in die ausgefahrene Position umfasst, so dass der Schlauchhalter (51) der Fußspitzenschließmaschine (50) wenigstens teilweise innerhalb des longitudinalen Hohlraums (4) des beweglichen Elements (6) eingefügt ist, und, anschließend der Abschnitt des zuvor auf das bewegliche Element (6) geladenen röhrenförmigen Produktes, von innen nach außen gewendet, auf den Schlauchhalter (51) transferiert wird, welcher außerhalb davon umhüllt wird,

und wobei das Verfahren einen Schritt eines Schneidens des oberen Endes des röhrenförmigen Produktes, vorzugsweise an der Referenzposition, umfasst, und wobei der Schritt des Schneidens des röhrenförmigen Produktes entlang einer Schneidelinie auftritt, welche ausgehend von dem oberen Ende startet und entlang oder bis zu der Referenzposition des röhrenförmigen Produktes verläuft und eine Form einer Linie oder eines Bandes oder eines grafischen Zeichens oder eines Musters oder eines oder mehrerer Anschlagpunkte aufweist.

2. Verfahren nach dem vorhergehenden Anspruch, wobei der Ladeschritt eines röhrenförmigen Produktes auf die wenigstens eine Schlauchladeeinrichtung (2) manuell oder automatisch durchgeführt wird, vorzugsweise mittels einer Aufnahme- und Platzier Vorrichtung, welche dazu eingerichtet und prädisponiert ist, ein röhrenförmiges Produkt aufzunehmen und das Produkt an dem wenigstens einen Schlauchhalter (2) außen zu umhüllen.
3. Verfahren nach Anspruch 1 oder 2, wobei die Referenzposition des röhrenförmigen Produktes aus einer Linie oder einem Band oder einem graphischen Zeichen oder einem Muster oder einem oder mehreren Anschlagpunkten besteht, wobei die Referenzposition dazu bestimmt ist, die Schneidelinie des röhrenförmigen Produktes ausgehend von dem oberen Ende davon oder einem Ende der Schneidelinie zu definieren, und wobei während des Schritts des Ladens des röhrenförmigen Produktes auf die Schlauchladeeinrichtung (2) das obere Ende an der Schlauchladeeinrichtung (2) umhüllt wird und das untere Ende frei von der Schlauchladeeinrichtung (2) herabhängt, oder wobei der Schritt des Transferierens des röhrenförmigen Produktes von der Schlauchladeeinrichtung (2) auf den Schlauchhalter (51) einen Schritt eines Ansaugens des Ab-

schnitts des röhrenförmigen Produktes, welcher frei von dem Schlauchhalter (2) herabhängt, ausgehend von dem unteren Ende des röhrenförmigen Produktes, innerhalb eines inneren Hohlraums der Schlauchladeeinrichtung (2) oder innerhalb eines jeweiligen inneren Hohlraums des Schlauchhalters (51) der Fußspitzenschließmaschine (50) umfasst.

4. Verfahren nach einem der vorhergehenden Ansprüche, wobei der Schritt des Transferierens des röhrenförmigen Produktes von der Schlauchladeeinrichtung (2) auf den Schlauchhalter (51) einen Schritt eines Greifens mittels beweglicher Greiforgane des Abschnitts des zuvor auf die Schlauchladeeinrichtung (2) geladenen röhrenförmigen Produktes, oder wenigstens des oberen Endes des röhrenförmigen Produktes umfasst, wobei solcher Abschnitt von der Schlauchladeeinrichtung (2) entladen wird und das röhrenförmige Produkt von innen nach außen gewendet an dem Schlauchhalter (51) außen umhüllt wird.
5. Verfahren nach einem der vorhergehenden Ansprüche, wobei der Referenzabschnitt (3) der Schlauchladeeinrichtung (2), daran umhüllt, den Abschnitt des röhrenförmigen Produktes aufnimmt, welcher dem Schneideschritt ausgesetzt wird, und wobei der Schneideschritt im Anschluss an den Ladeschritt oder vor dem Transferschritt ausgeführt wird, und wobei der Schneideschritt mittels einer Schneidevorrichtung (30) ausgeführt wird, welche vorzugsweise eine Klinge aufweist oder Ultraschall oder einen heißen Draht verwendet, und wobei der Schneideschritt einen Schritt eines Auswählens oder Regulierens einer Länge und/oder einer Form der Schneidelinie umfasst.
6. Verfahren nach einem der vorhergehenden Ansprüche, wobei der Ladeschritt in einer Ladestation (11) ausgeführt wird, der Schritt des automatischen Transferierens in einer Transferstation (12), verschieden und separat von der Ladestation (11), ausgeführt wird, und die wenigstens eine Schlauchladeeinrichtung (2) während des Positionierschritts zwischen der Ladestation (11) und der Transferstation (12) bewegt wird, und wobei der Schneideschritt in der Ladestation (11) oder in der Transferstation (11) oder während des Positionierschritts oder in einer Zwischenposition zwischen der Ladestation (11) und der Transferstation (12) oder in einer Schneidestation (13) ausgeführt wird.
7. Verfahren nach dem vorhergehenden Anspruch, wobei wenn die Schlauchladeeinrichtung (2) von der Ladestation (11) zu der Transferstation (12) bewegt wird, eine weitere Schlauchladeeinrichtung (2) in der Ladestation (11) prädisponiert wird, um einen weiteren Ladeschritt eines weiteren röhrenförmigen

Produktes auszuführen.

8. Verfahren nach Anspruch 6, umfassend, an einem Ende des Transferschrittes einen Schritt eines Zurückbringens der wenigstens einen Schlauchladeeinrichtung (2), oder einer Mehrzahl von Schlauchladeeinrichtungen (2) in Folge, in die Ladestation (11), um die Schritte des Verfahrens an aufeinanderfolgenden röhrenförmigen Produkten zyklisch zu wiederholen.
9. Verfahren nach einem der vorhergehenden Ansprüche, ferner umfassend einen oder mehrere der folgenden Schritte:
 - Prädisponieren einer oder mehrerer Verriegelungsplatten (8), welche dem beweglichen Element (6) betriebsmäßig und bewegbar zugeordnet sind und zwischen einer offenen Konfiguration, in welcher sie in Bezug auf das bewegliche Element (6) äußerlich beabstandet sind, und einer geschlossenen Konfiguration betreibbar sind, in welcher sie an das bewegliche Element (6) angenähert sind, wobei sich die Verriegelungsplatten (8) während des Ladeschritts in der offenen Konfiguration befinden, um ein Laden des röhrenförmigen Produktes auf die Schlauchladeeinrichtung (2) zu erlauben, und in die geschlossene Konfiguration gebracht werden, wenn das Laden abgeschlossen ist, und wobei die Verriegelungsplatten (8) während des Schneideschritts oder auf diesen folgend in der geschlossenen Konfiguration gehalten werden, um zwei Laschen eines Produkts zu halten, welche durch den Schneideschritt umhüllt an der Schlauchladeeinrichtung (2) erzeugt werden, und wobei die Verriegelungsplatten (8) während des Transferschritts in die offene Konfiguration zurückgebracht werden, um einen Transfer des röhrenförmigen Produktes auf die Schlauchladeeinrichtung (51) zu erlauben;
 - möglicherweise, Auswählen oder Ersetzen der wenigstens einen Schlauchladeeinrichtung (2) oder des beweglichen Elements (6) der Schlauchladeeinrichtung (2) gemäß der Gestalt des Schlauchhalters (51) oder gemäß dem Typ des röhrenförmigen Produkts;
 - bei Abschluss des Transfers, zurückbringen des beweglichen Elements (6) der Schlauchladeeinrichtung (2), ohne das röhrenförmige Produkt, in die eingefahrene Position, wobei das Produkt orientiert oder geschnitten an dem Schlauchhalter (51) der Fußspitzenschließmaschine (50) gelassen wird;
 - dem Transferschritt folgend, Bewegen wenigstens einer Schlauchladeeinrichtung (2) von der Position, in welcher der Transferschritt durchgeführt wird, in die Position, in welcher der La-

deschritt durchgeführt wird, um ein Laden eines darauffolgenden röhrenförmigen Produktes zu ermöglichen.

10. System, umfassend eine Vorrichtung (1) zum Laden und Transferieren von röhrenförmigen Textilprodukten auf eine Fußspitzenschließmaschine (50) und eine Fußspitzenschließmaschine (50) zur Produktion von Strumpfhosen, wobei sich jedes der röhrenförmigen Produkte longitudinal zwischen einem oberen Ende und einem unteren Ende erstreckt, wobei beide Enden geöffnet sind, wobei das untere Ende dazu bestimmt ist, mittels der Fußspitzenschließmaschine (50) vernäht zu werden, um die Spitze eines Beines der Strumpfhose auszubilden und das obere Ende dazu bestimmt ist, geschnitten zu werden, um anschließend mit dem jeweiligen geschnittenen oberen Ende eines weiteren röhrenförmigen Produktes verbunden zu werden, um ein Paar von Beinen einer Strumpfhose auszubilden, wobei das System **dadurch gekennzeichnet ist, dass** die Vorrichtung wenigstens eine Schlauchladeeinrichtung (2) umfasst, welche mit wenigstens einem Referenzabschnitt (3) bereitgestellt ist und mittels eines Bewegungsmittels (40) wenigstens zwischen den folgenden zyklisch bewegbar ist:

- einer Ladestation (11), welche dazu eingerichtet und bestimmt ist, ein wenigstens teilweises Laden eines röhrenförmigen Produktes auf die wenigstens eine Schlauchladeeinrichtung (2) zu ermöglichen, wobei das röhrenförmige Produkt die Schlauchladeeinrichtung (2) ausgehend von dem oberen Ende außen umhüllt, so dass eine Referenzposition des röhrenförmigen Produktes mit dem Referenzabschnitt (3) der Schlauchladeeinrichtung (2) ausgerichtet oder in Bezug auf diesen orientiert ist oder diesem entspricht;
- eine Transferstation (12), in welcher die Schlauchladeeinrichtung (2) an einem Schlauchhalter (51) der Fußspitzenschließmaschine (50) derart positioniert oder mit diesem ausgerichtet ist, dass der Referenzabschnitt (3) der Schlauchladeeinrichtung (2) mit einem spezifischen Abschnitt des Schlauchhalters (51) ausgerichtet oder in Bezug auf diesen orientiert ist oder diesem entspricht; wobei die Vorrichtung (1) zum automatischen Transferieren des röhrenförmigen Produktes an der Transferstation (12) von der Schlauchladeeinrichtung (2) auf den Schlauchhalter (51) eingerichtet und prädisponiert ist, in dem es eine Innenseite des röhrenförmigen Produktes von innen nach außen wendet und das Produkt außerhalb des Schlauchhalters (51) umhüllt, während die jeweilige Referenzposition des röhrenförmigen Produktes ausgerichtet mit dem spezifischen

Abschnitt des Schlauchhalters (51) oder orientiert in Bezug auf diesen oder diesem entsprechend aufrechterhalten wird, wobei die wenigstens eine Schlauchladeeinrichtung (2) einen Haltestab (5) und wenigstens ein bewegliches Element (6) umfasst, welches dem Haltestab (5) verschiebbar zugeordnet ist und dazu eingerichtet ist, wenigstens zwischen einer eingefahrenen Position, in welcher es den Haltestab (5) im Wesentlichen umgibt, und einer ausgefahrenen Position zu wirken, in welcher es sich über den Haltestab (5) hinaus erstreckt und innerhalb davon einen longitudinalen Hohlraum (4) definiert, welcher gegengeformt zu wenigstens einem Abschnitt des Schlauchhalters (51) ist, und wobei die Vorrichtung ein an der Transferstation (12) angeordnetes Schiebeorgan (15) umfasst, welches derart eingerichtet ist, dass es mit dem beweglichen Element (6) der Schlauchladeeinrichtung (2) zusammenwirkt und einen Übergang davon zwischen der eingefahrenen Konfiguration und der ausgefahrenen Konfiguration bewirkt, und wobei der Übergang des beweglichen Elements (6) in die ausgefahrene Position ein Einbringen der Schlauchladevorrichtung (51) der Fußspitzenschließvorrichtung (50) wenigstens teilweise innerhalb des longitudinalen Hohlraums (4) des beweglichen Elements (6), und, anschließend einen Transfer, mit einem Wenden einer Innenseite nach außen, des Abschnitts des röhrenförmigen Produktes, welcher zuvor auf das bewegliche Element geladen worden ist, auf den Schlauchhalter (51) bestimmt, wobei das bewegliche Element (6) ein Paar von verschiebbaren Abschnitten (7) umfasst, welche vorzugsweise identisch zueinander sind, an entgegengesetzten Seiten des Haltestabs (5) angeordnet sind und bewegbar, vorzugsweise zusammen, in Bezug auf den Haltestab (5) in dem Übergang des beweglichen Elements (6) zwischen der eingefahrenen und der ausgefahrenen Konfiguration sind, wobei die verschiebbaren Abschnitte (7) jeweils derart angepasst sind, dass sie innen einen jeweiligen Sitz (7a) definieren, welcher gegengeformt zu einem seitlichen Streifen (53) des Schlauchhalters (51) der Fußspitzenschließmaschine (50) ist, und dass sie zwischen diesen den longitudinalen Hohlraum (4) definieren, welcher gegengeformt zu einer zentralen Röhre (52) des Schlauchhalters (51) ist, wobei die Vorrichtung (1) Ansaugmittel umfasst, welche dazu eingerichtet sind, wenigstens an der Transferstation (12), den Abschnitt, welcher frei von dem Schlauchhalter (2) herabhängt, ausgehend von dem unteren Ende des röhrenförmigen Produktes, innerhalb eines inneren

- Hohlraums der Schlauchladeeinrichtung (2) anzusaugen,
und wobei die Vorrichtung (1) eine Schneidevorrichtung (30) umfasst, welche dazu eingerichtet und prädisponiert ist, das obere Ende des röhrenförmigen Produktes, welches auf die Schlauchladeeinrichtung (2) geladen ist, entlang einer Schneidelinie zu schneiden, und wobei die Schneidevorrichtung (30) an dem Abschnitt des röhrenförmigen Produktes, welcher an der Referenzposition positioniert ist, ein Schneiden durchführt, und wobei die Schneidelinie ausgehend von dem oberen Ende startet und entlang oder bis zu der Referenzpositionen des röhrenförmigen Produktes verläuft und eine Form einer Linie oder eines Bandes oder eines grafischen Zeichens oder eines Musters oder eines oder mehrerer Anschlagpunkte aufweist.
11. System nach dem vorhergehenden Anspruch, wobei das bewegliche Element (6) ein Kopplungselement (16) umfasst, welches derart eingerichtet ist, dass es, wenn die Schlauchladevorrichtung (51) in der Transferposition (12) positioniert ist, mit dem Schieberorgan (15) zusammenwirkt, um davon eine Bewegung aufzunehmen, welche zum Bestimmen des Übergangs des beweglichen Elements (6) zwischen der eingefahrenen und der ausgefahrenen Konfiguration erforderlich ist.
12. System nach Anspruch 10 oder 11, wobei die Schneidevorrichtung (30) eingerichtet ist, um das Schneiden des röhrenförmigen Produktes an der Ladestation (11) oder an der Transferstation (12) oder während des Transfers der Schlauchladeeinrichtung zwischen der Ladestation (11) und der Transferstation (12) oder in einer Zwischenposition zwischen der Ladestation (11) und der Transferstation (12) oder an einer Schneidestation (13) durchzuführen, oder direkt an der Schlauchladevorrichtung (2) montiert ist.
13. System nach einem der Ansprüche 10 bis 12, wobei die Schlauchladevorrichtung (2) eine oder mehrere Verriegelungsplatten (8) umfasst, welche dem beweglichen Element (6) betriebsmäßig und bewegbar zugeordnet sind und zwischen einer offenen Konfiguration, in welcher sie in Bezug auf das bewegliche Element (6) äußerlich beabstandet sind, und einer geschlossenen Konfiguration betreibbar sind, in welcher sie an das bewegliche Element (6) angenähert sind, wobei die Verriegelungsplatten (8) derart eingerichtet sind, dass sie, in der offenen Konfiguration, das Laden und den Transfer des röhrenförmigen Produktes auf die Schlauchladeeinrichtung (2) bzw. von dieser weg ermöglichen, und, dass sie in der geschlossenen Konfiguration, zwei Laschen eines Produkts halten, welche durch die Schneidevorrichtung (30) erzeugt werden und an der Schlauchladeeinrichtung (2) umhüllt sind.
14. System nach einem der Ansprüche 12 bis 13, wobei die Vorrichtung zwei oder drei oder vier, oder eine Anzahl von mehr als vier der Schlauchladeeinrichtungen (2) umfasst, welche vorzugsweise gleich voneinander beabstandet sind und wenigstens zwischen der Ladestation (11) und der Schneidestation (13) und der Transferstation (12) mittels des Bewegungsmittels (40) zyklisch bewegt werden.
15. System nach einem der Ansprüche 12 bis 14, wobei das Bewegungsmittel (40) einen geschlossenen Riemen (41), an welchem die Schlauchladeeinrichtungen (2) fixiert sind, und einen Aktuator umfasst, wobei der geschlossene Riemen (41) selektiv mittels des Aktuators in einer derartigen Weise bewegt wird, dass er die Schlauchladeeinrichtungen (2) der Ladestation (11) und die Schneidestation (13) und die Transferstation (12) gemäß einem vorbestimmten Betriebszyklus positioniert.
- ## Revendications
1. Procédé de charge et de transfert de produits textiles tubulaires sur une machine de fermeture d'orteils (50) pour la production de bas, chacun desdits produits tubulaires s'étendant longitudinalement entre une extrémité supérieure et une extrémité inférieure, les deux extrémités étant ouvertes, l'extrémité inférieure étant destinée à être cousue à l'aide de la machine de fermeture d'orteils afin de former la pointe d'une jambe d'une paire de bas et l'extrémité supérieure étant destinée à être coupée afin d'être jointe par la suite à l'extrémité supérieure respective, également coupée, d'un produit tubulaire supplémentaire pour former une paire de jambes des bas, le procédé étant **caractérisé en ce qu'il** comprend les étapes de :
- pré-disposition d'au moins une machine de fermeture d'orteils (50), pourvue d'au moins un support de tube (51) ;
 - pré-disposition d'au moins un chargeur de tube (2) muni d'au moins une partie de référence (3) ;
 - la charge au moins partiellement d'un produit tubulaire sur ledit au moins un chargeur de tube (2), enveloppant au plan externe le produit tubulaire sur le chargeur de tube en commençant de ladite extrémité supérieure, de sorte qu'une position de référence du produit tubulaire est alignée sur, ou orientée par rapport à, ou correspond à, ladite partie de référence (3) dudit chargeur de tube (2) ;
 - le positionnement dudit chargeur de tube (2) au niveau ou aligné sur le support de tube (51)

de la machine de fermeture d'orteils (50), d'une manière telle que la partie de référence (3) du chargeur de tube (2) est alignée sur, ou orientée par rapport à, ou correspond à, une partie spécifique dudit support de tube (51) ;

- le transfert automatiquement dudit produit tubulaire depuis ledit chargeur de tube (2) vers ledit support de tube (51) en retournant le produit tubulaire et en enveloppant le produit au plan externe sur ledit support de tube, tout en maintenant ladite position de référence respective du produit tubulaire aligné sur, ou orienté par rapport à, ou correspondant à, ladite partie spécifique dudit support de tube,

où ledit au moins un chargeur de tube (2) comprend une barre de support (5) et au moins un élément mobile (6) associé de manière à pouvoir faire effectuer une translation à la barre de support (5) afin de fonctionner au moins entre une position rétractée, dans laquelle il enveloppe sensiblement ladite barre de support (5), et une position avancée, dans laquelle il s'étend au-delà de la barre de support (5) et définit au plan interne de celle-ci une cavité longitudinale (4) en contreforme par rapport à au moins une partie dudit support de tube (51), dans lequel - durant ladite étape de charge - le produit tubulaire est enveloppé sur ledit élément mobile (6) dans ladite position rétractée, et ladite étape de transfert du produit tubulaire depuis le chargeur de tube (2) vers le support de tube (51) comprend une étape consistant à porter ledit élément mobile (6) du support de tube (51) dans ladite position avancée de sorte que le support de tube (51) de la machine de fermeture d'orteils (50) s'insère au moins partiellement au plan interne de la cavité longitudinale (4) de l'élément mobile (6) et, par conséquent, la partie du produit tubulaire précédemment chargée sur l'élément mobile (6) est transférée, retournée, sur le support de tube (51), étant enveloppée au plan externe de celui-ci, et où le procédé comprend une étape de coupe de l'extrémité supérieure du produit tubulaire, préféablement au niveau de ladite position de référence, et où ladite étape de coupe du produit tubulaire se produit le long d'une ligne de coupe qui commence depuis l'extrémité supérieure et se développe le long, ou jusqu'à, ladite position de référence du produit tubulaire présentant une forme de ligne ou de bande ou de signe graphique ou de motif ou d'un ou plusieurs points d'arrêt.

2. Procédé selon la revendication précédente, dans lequel ladite étape de charge d'un produit tubulaire sur ledit au moins un chargeur de tube (2) est effectuée manuellement ou automatiquement, préféablement à l'aide d'un dispositif de prélèvement et de mise en place et pré-disposé pour prélever un produit tubulaire et pour envelopper le produit au plan externe

sur ledit au moins un chargeur de tube (2).

3. Procédé selon la revendication 1 ou 2, dans lequel ladite position de référence du produit tubulaire est une ligne ou une bande ou un signe graphique ou un motif ou un ou plusieurs points d'arrêt, ladite position de référence étant destinée à délimiter ladite ligne de coupe du produit tubulaire en commençant depuis son extrémité supérieure ou une extrémité de la ligne de coupe, et où durant ladite étape de charge du produit tubulaire sur le chargeur de tube (2) l'extrémité supérieure est enveloppée sur le chargeur de tube (2) et l'extrémité inférieure pend librement depuis ledit chargeur de tube (2), ou où ladite étape de transfert du produit tubulaire depuis ledit chargeur de tube (2) vers ledit support de tube (51) comprend une étape d'aspiration de la partie du produit tubulaire pendant librement du chargeur de tube (2), en commençant depuis l'extrémité inférieure du produit tubulaire, au plan interne d'une cavité interne du chargeur de tube (2) ou au plan interne d'une cavité interne respective du support de tube (51) de la machine de fermeture d'orteils (50).
4. Procédé selon l'une quelconque des revendications précédentes, dans lequel ladite étape de transfert du produit tubulaire depuis le chargeur de tube (2) vers le support de tube (51) comprend une étape de préhension, à l'aide d'organes de préhension mobiles, de la partie du produit tubulaire précédemment chargée sur le chargeur de tube (2), ou au moins l'extrémité supérieure du produit tubulaire, le déchargement d'une telle partie du chargeur de tube (2) et l'enveloppement du produit tubulaire, retourné, au plan externe sur le support de tube (51).
5. Procédé selon l'une quelconque des revendications précédentes, dans lequel ladite partie de référence (3) du chargeur de tube (2) loge, enveloppée dessus, la partie du produit tubulaire soumise à l'étape de coupe, et où l'étape de coupe est réalisée après l'étape de charge ou avant l'étape de transfert, et où l'étape de coupe est réalisée à l'aide d'un dispositif de coupe (30) préféablement ayant une lame ou en utilisant des ultrasons ou un fil chaud, et où l'étape de coupe comprend une étape de sélection ou de régulation d'une longueur et/ou d'une forme de ladite ligne de coupe.
6. Procédé selon l'une quelconque des revendications précédentes, dans lequel ladite étape de charge est réalisée dans une station de charge (11), ladite étape de transfert automatiquement est réalisée dans une station de transfert (12), distincte et séparée de ladite station de charge (11), et ledit au moins un chargeur de tube (2), durant ladite étape de positionnement, est déplacé entre ladite station de charge (11) et ladite station de transfert (12), et où ladite étape de

coupe est réalisée dans la station de charge (11) ou dans la station de transfert (11) ou durant l'étape de positionnement ou dans une position intermédiaire entre ladite station de charge (11) et ladite station de transfert (12) ou dans une station de coupe (13).

7. Procédé selon la revendication précédente, dans lequel lorsque ledit chargeur de tube (2) est déplacé depuis ladite station de charge (11) vers ladite station de transfert (12), un chargeur supplémentaire de tube (2) est prédisposé dans ladite station de charge (11) pour effectuer une étape de charge supplémentaire d'un produit tubulaire supplémentaire.
8. Procédé selon la revendication 6, comprenant, à une extrémité de l'étape de transfert, une étape de renvoi dudit au moins un chargeur de tube (2), ou d'une pluralité de chargeurs de tube (2) en succession, dans ladite station de charge (11), afin de répéter de manière cyclique les étapes du procédé sur des produits tubulaires successifs.
9. Procédé selon l'une quelconque des revendications précédentes, comprenant en outre une ou plusieurs des étapes suivantes :
 - pré-disposition d'une ou plusieurs plaques de verrouillage (8) associées fonctionnellement et de manière mobile audit élément mobile (6) et pouvant fonctionner entre une configuration ouverte, dans laquelle elles sont écartées au plan externe par rapport à l'élément mobile (6), et une configuration fermée, dans laquelle elles sont près de l'élément mobile (6), dans laquelle durant l'étape de charge les plaques de verrouillage (8) se trouvent en configuration ouverte afin de permettre la charge du produit tubulaire sur le chargeur de tube (2) et sont portées en configuration fermée lorsque la charge est achevée, et où les plaques de verrouillage (8) sont maintenues en configuration fermée durant ou successivement à l'étape de coupe, afin de maintenir deux rabats du produit créés par l'étape de coupe enveloppés sur le chargeur de tube (2), et où durant l'étape de transfert les plaques de verrouillage (8) sont renvoyées dans la configuration ouverte afin de permettre le transfert du produit tubulaire sur le chargeur de tube (51) ;
 - de manière possible, la sélection ou le remplacement dudit au moins un chargeur de tube (2), ou dudit élément mobile (6) du chargeur de tube (2), selon la conformation du support de tube (51) ou selon le type de produit tubulaire ;
 - à l'achèvement du transfert, le renvoi dudit élément mobile (6) du chargeur de tube (2), sans le produit tubulaire, dans ladite position rétractée, laissant le produit, orienté ou coupé, sur le support de tube (51) de la machine de fermeture

d'orteils (50) ;

- suite à ladite étape de transfert, le déplacement dudit au moins un chargeur de tube (2) depuis la position dans laquelle l'étape de transfert est exécutée vers la position dans laquelle l'étape de charge est exécutée, afin de permettre la charge d'un produit tubulaire successif.

10. Système comprenant un appareil (1) de charge et de transfert de produits textiles tubulaires sur une machine de fermeture d'orteils (50) et une machine de fermeture d'orteils (50), pour produire des bas, chacun des produits tubulaires s'étendant longitudinalement entre une extrémité supérieure et une extrémité inférieure, toutes les deux ouvertes, l'extrémité inférieure étant destinée à être cousue par la machine de fermeture d'orteils (50) afin de former la pointe d'une jambe des bas et l'extrémité supérieure étant destinée à être coupée afin d'être jointe par la suite à l'extrémité supérieure de coupe respective d'un produit tubulaire supplémentaire afin de former une paire de jambes d'une paire de bas, le système étant **caractérisé en ce que** l'appareil comprend au moins un chargeur de tube (2) muni d'au moins une partie de référence (3) et mobile de manière cyclique, à l'aide de moyen de déplacement (40), au moins entre :
 - une station de charge (11), configurée pour et destinée à permettre au moins une charge partielle d'un produit tubulaire sur ledit au moins un chargeur de tube (2), le produit tubulaire enveloppant au plan externe le chargeur de tube (2) en commençant depuis l'extrémité supérieure, de sorte qu'une position de référence du produit tubulaire est alignée sur, ou orientée par rapport à, ou correspond à, ladite partie de référence (3) du chargeur de tube (2) ;
 - une station de transfert (12), dans laquelle ledit chargeur de tube (2) est positionné au niveau ou est aligné sur un support de tube (51) de la machine de fermeture d'orteils (50), d'une manière telle que la partie de référence (3) du chargeur de tube (2) est alignée sur, ou orientée par rapport à, ou correspond à, une partie spécifique dudit support de tube (51) ; où ledit appareil (1) est configuré et prédisposé pour automatiquement transférer, au niveau de ladite station de transfert (12), le produit tubulaire depuis le chargeur de tube (2) vers le support de tube (51), en retournant le produit tubulaire et en enveloppant le produit au plan externe dudit support de tube (51), tout en maintenant ladite position de référence respective du produit tubulaire aligné sur, ou orienté sur, ou correspondant à, ladite partie spécifique du support de tube (51),

où ledit au moins un chargeur de tube (2) comprend

une barre de support (5) et au moins un élément mobile (6) associé de manière à pouvoir effectuer une translation vers la barre de support (5) et configuré afin de fonctionner au moins entre une position rétractée, dans laquelle il entoure sensiblement ladite barre de support (5), et une position avancée, dans laquelle il s'étend au-delà de barre de support (5) et délimite au plan interne de celle-ci une cavité longitudinale (4) en contreforme vis-à-vis d'au moins une partie dudit support de tube (51), et où ledit appareil comprend un organe de poussée (15), localisé au niveau de ladite station de transfert (12), configuré afin de coopérer avec l'élément mobile (6) du chargeur de tube (2) et provoquer son passage entre ladite configuration rétractée et ladite configuration avancée, et où le passage de l'élément mobile (6) dans ladite position avancée détermine l'insertion du chargeur de tube (51) de la machine de fermeture d'orteils (50) au moins partiellement au plan interne de la cavité longitudinale (4) dudit élément mobile (6) et, par conséquent, un transfert, avec un retournement, de la partie de produit tubulaire, précédemment chargée sur l'élément mobile (6), sur le support de tube (51),

où ledit élément mobile (6) comprend une paire de parties pouvant effectuer une translation (7), préférentiellement identiques l'une par rapport aux autres, disposées sur les côtés opposés de la barre de support (5) et mobiles, préférentiellement ensemble, par rapport à la barre de support (5) dans le passage de l'élément mobile (6) entre les configurations rétractée et avancée, lesdites parties pouvant effectuer une translation (7) étant chacune conformées d'une manière à pouvoir délimiter au plan interne une assise respective (7a) en contreforme d'un onglet latéral respectif (53) du support de tube (51) de la machine de fermeture d'orteils (50), et afin de définir entre-eux ladite cavité longitudinale (4) en contreforme par rapport à un tube central (52) dudit support de tube (51),

où l'appareil (1) comprend un moyen d'aspiration configuré afin d'aspirer, au moins au niveau de ladite station de transfert (12), la partie du produit tubulaire pendant librement depuis le chargeur de tube (2), en commençant depuis l'extrémité inférieure du produit tubulaire, au plan interne d'une cavité interne du chargeur de tube (2),

et où l'appareil (1) comprend un dispositif de coupe (30) configuré et prédisposé pour couper l'extrémité supérieure du produit tubulaire chargé sur ledit chargeur de tube (2) le long d'une ligne de coupe, et où le dispositif de coupe (30) effectue une découpe sur la partie du produit tubulaire positionnée au niveau de ladite position de référence, et où ladite ligne de coupe commence depuis l'extrémité supérieure et se développe le long, ou jusqu'à, ladite position de référence du produit tubulaire ayant une forme de ligne ou de bande ou de signe graphique ou de motif

ou d'un ou plusieurs points d'arrêt.

11. Système selon la revendication précédente, dans lequel ledit élément mobile (6) comprend un élément d'accouplement (16) configuré afin de coopérer, lorsque le chargeur de tube (51) est positionné dans ladite station de transfert (12), avec ledit organe de poussée (15), afin de recevoir de là un mouvement nécessaire pour déterminer le passage de l'élément mobile (6) entre les configurations rétractée et avancée.

12. Système selon la revendication 10 ou 11, dans lequel le dispositif de coupe (30) est configuré afin d'effectuer la coupe du produit tubulaire au niveau de la station de charge (11) ou de la station de transfert (12) ou durant le transfert du chargeur de tube entre la station de charge (11) et la station de transfert (12) ou dans une position intermédiaire entre la station de charge (11) et la station de transfert (12) ou au niveau d'une station de coupe (13), ou est monté directement sur ledit chargeur de tube (2).

13. Système selon l'une quelconque des revendications 10 à 12, où ledit chargeur de tube (2) comprend une ou plusieurs plaques de verrouillage (8) associées fonctionnellement et de manière mobile audit élément mobile (6) et pouvant fonctionner entre une configuration ouverte, dans laquelle les plaques de verrouillage (8) sont écartées au plan externe par rapport à l'élément mobile (6), et une configuration fermée, dans laquelle elles sont proches de l'élément mobile (6), où les plaques de verrouillage (8) sont configurées afin de permettre, dans la configuration ouverte, la charge et le transfert du produit tubulaire sur et depuis le chargeur de tube (2) et, dans la configuration fermée, afin de maintenir deux rabats du produit créés par le dispositif de coupe (30) enveloppés sur le chargeur de tube (2).

14. Système selon l'une quelconque des revendications 12 à 13, dans lequel l'appareil (1) comprend deux ou trois ou quatre, ou un nombre supérieur à quatre, desdits chargeurs de tube (2), préférentiellement à équidistance l'un de l'autre et cycliquement déplacés au moins entre la station de charge (11) et la station de coupe (13) et la station de transfert (12) à l'aide dudit moyen de déplacement (40).

15. Système selon l'une quelconque des revendications 12 à 14, dans lequel ledit moyen de déplacement (40) comprend une courroie fermée (41), à laquelle les chargeurs de tube (2) sont fixés, et un dispositif d'actionnement, ladite courroie fermée (41) étant déplacée sélectivement à l'aide dudit dispositif d'actionnement, d'une manière permettant de positionner les chargeurs de tube (2) de la station de charge (11) et la station de coupe (13) et la station de trans-

fert (12) selon un cycle de fonctionnement prédéterminé.

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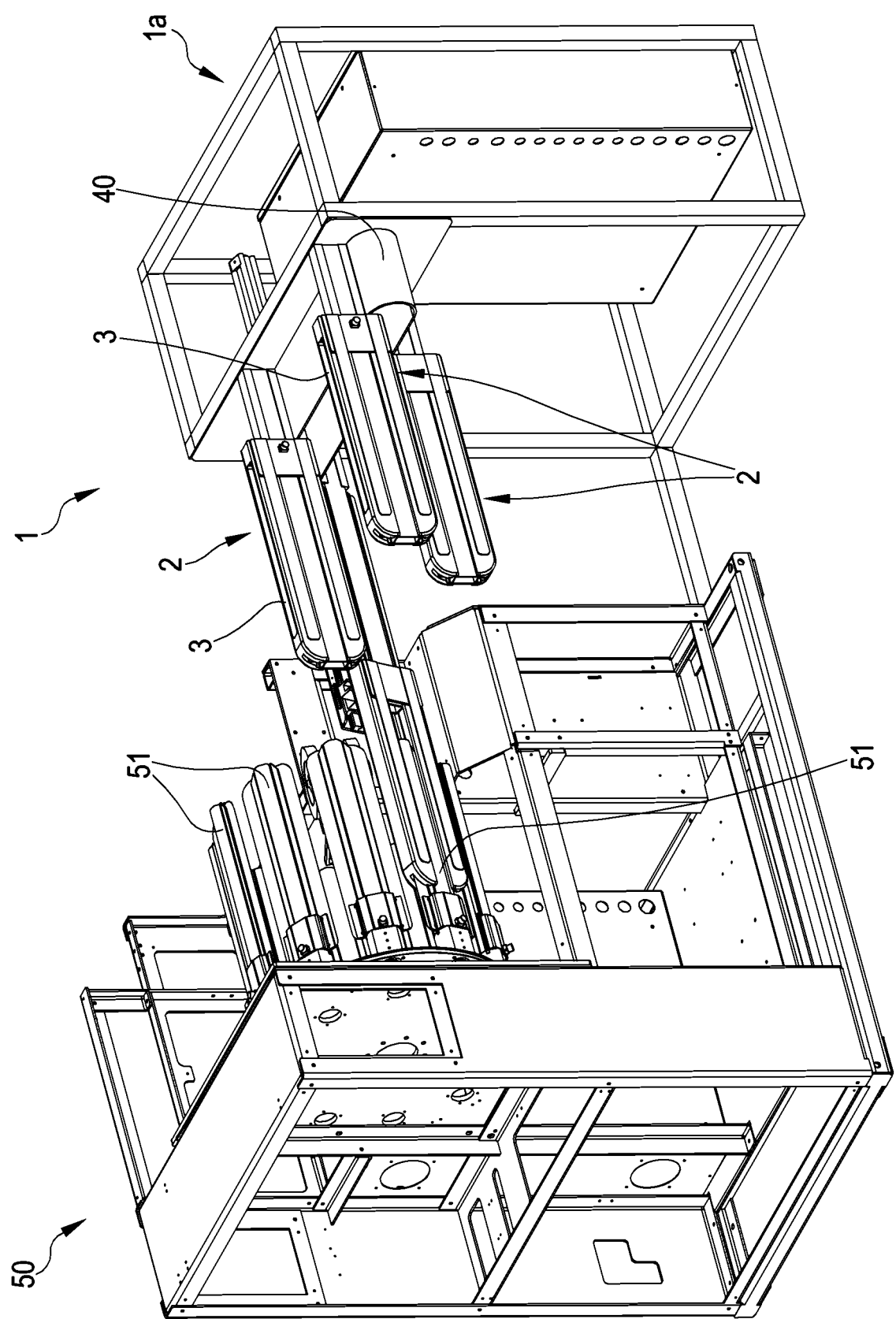
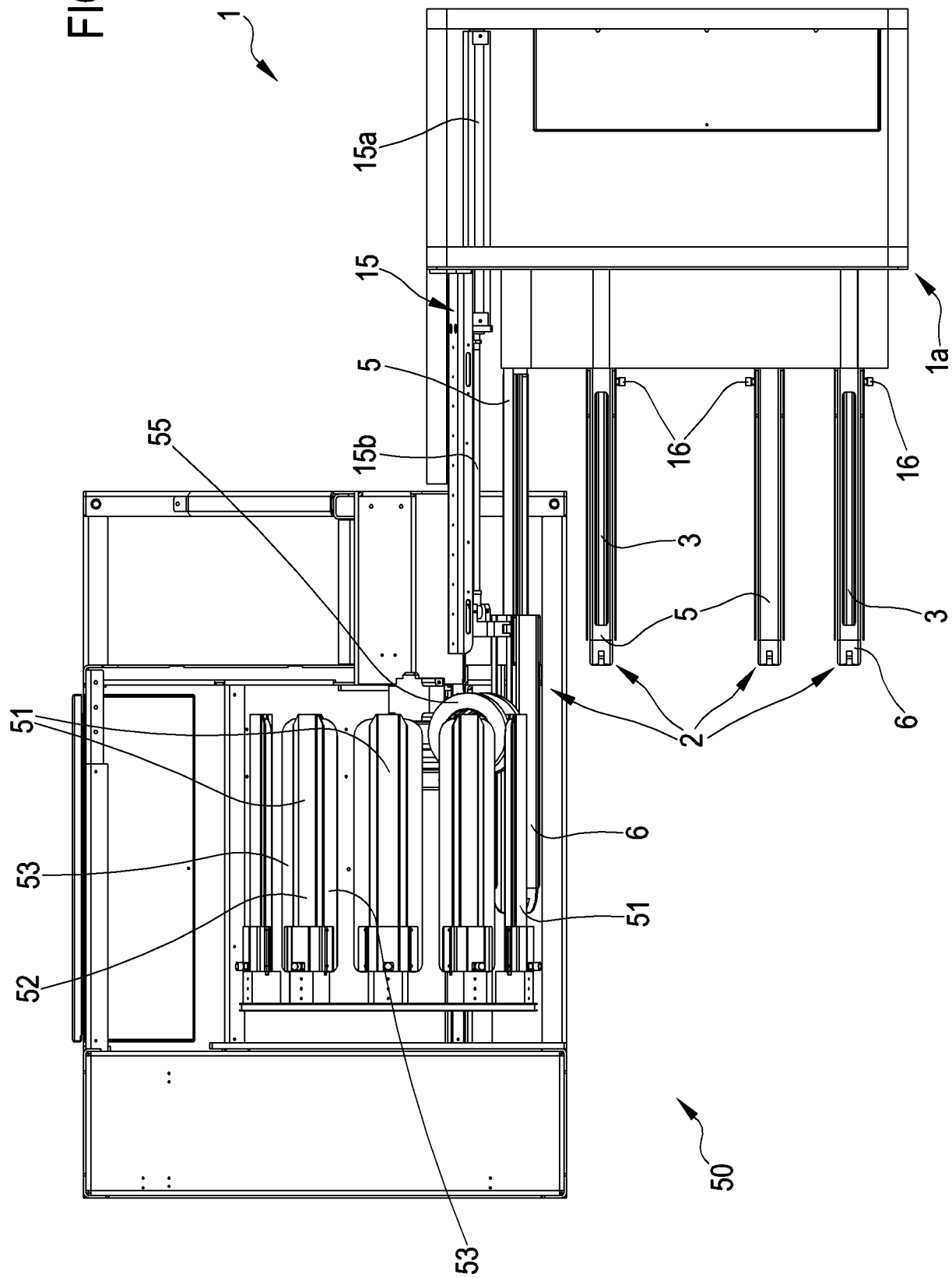


FIG.1



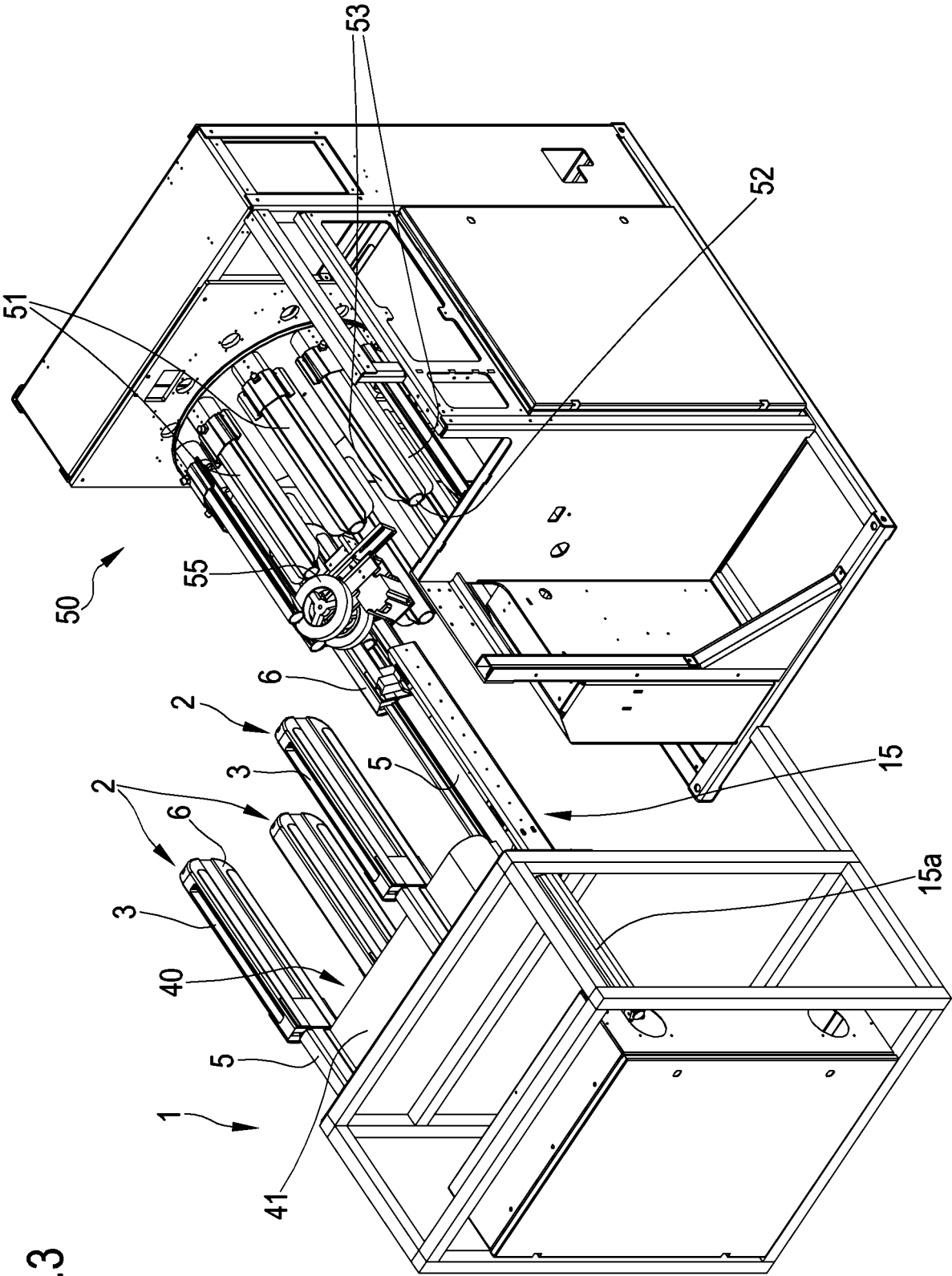


FIG.3

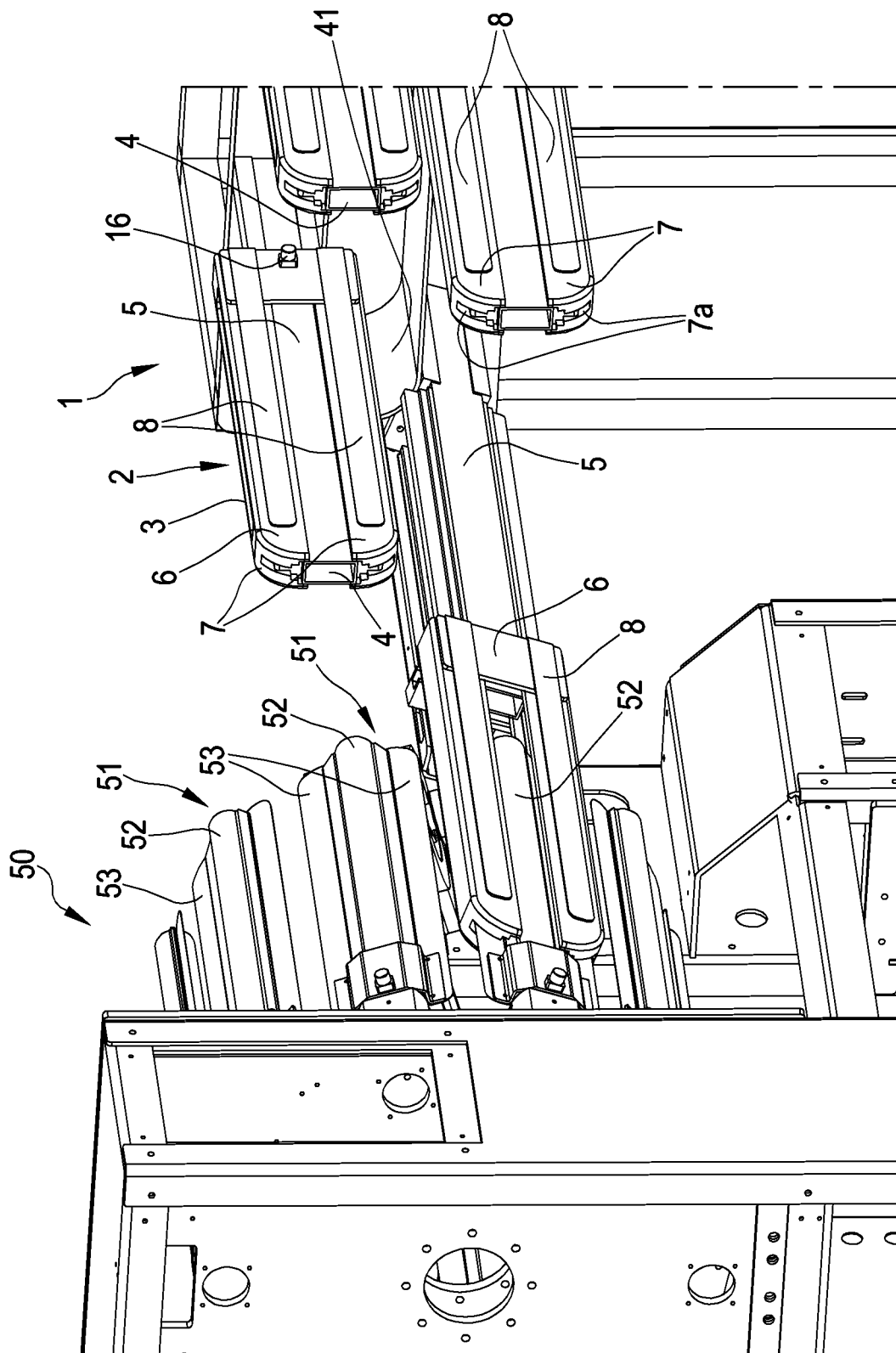
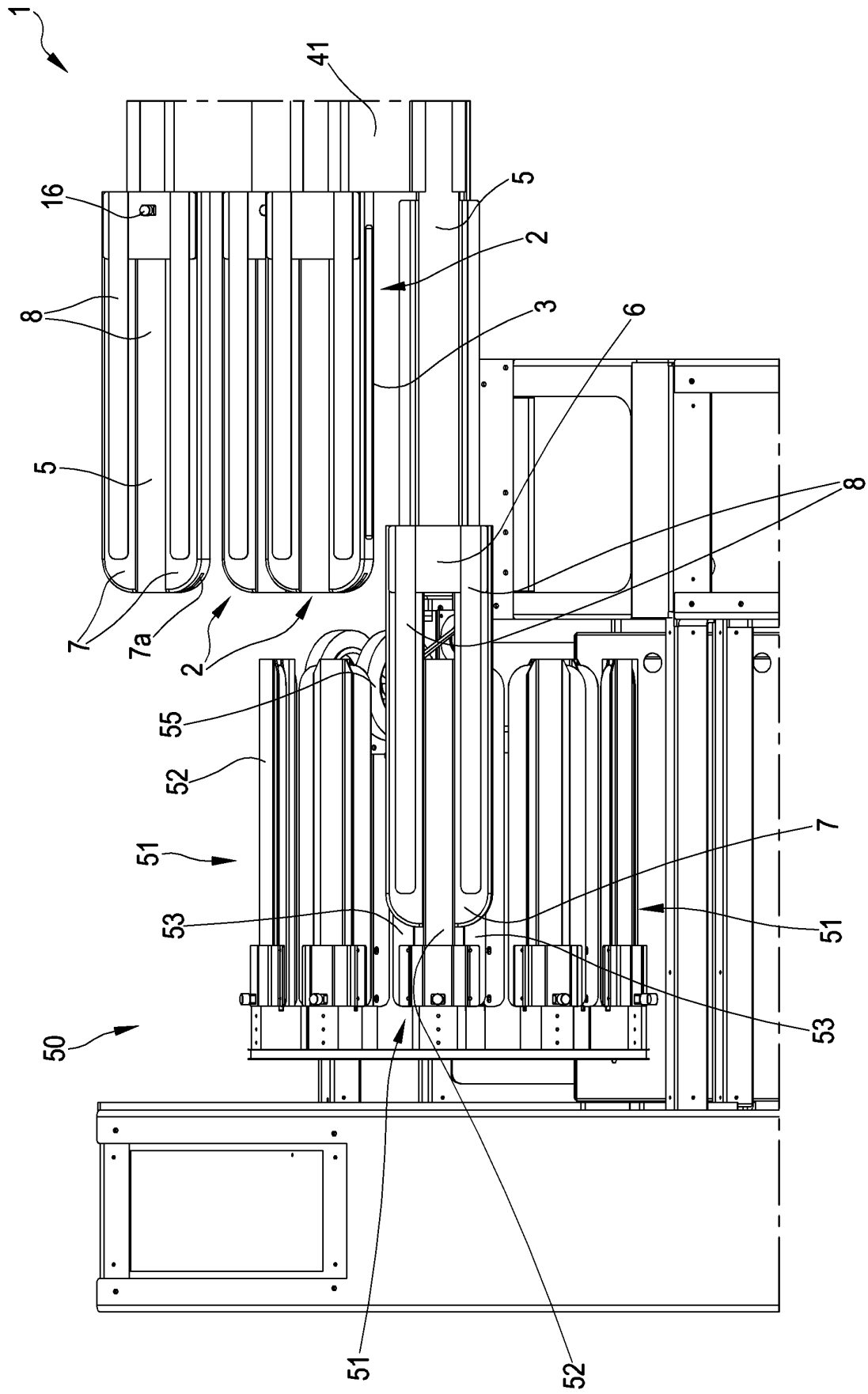
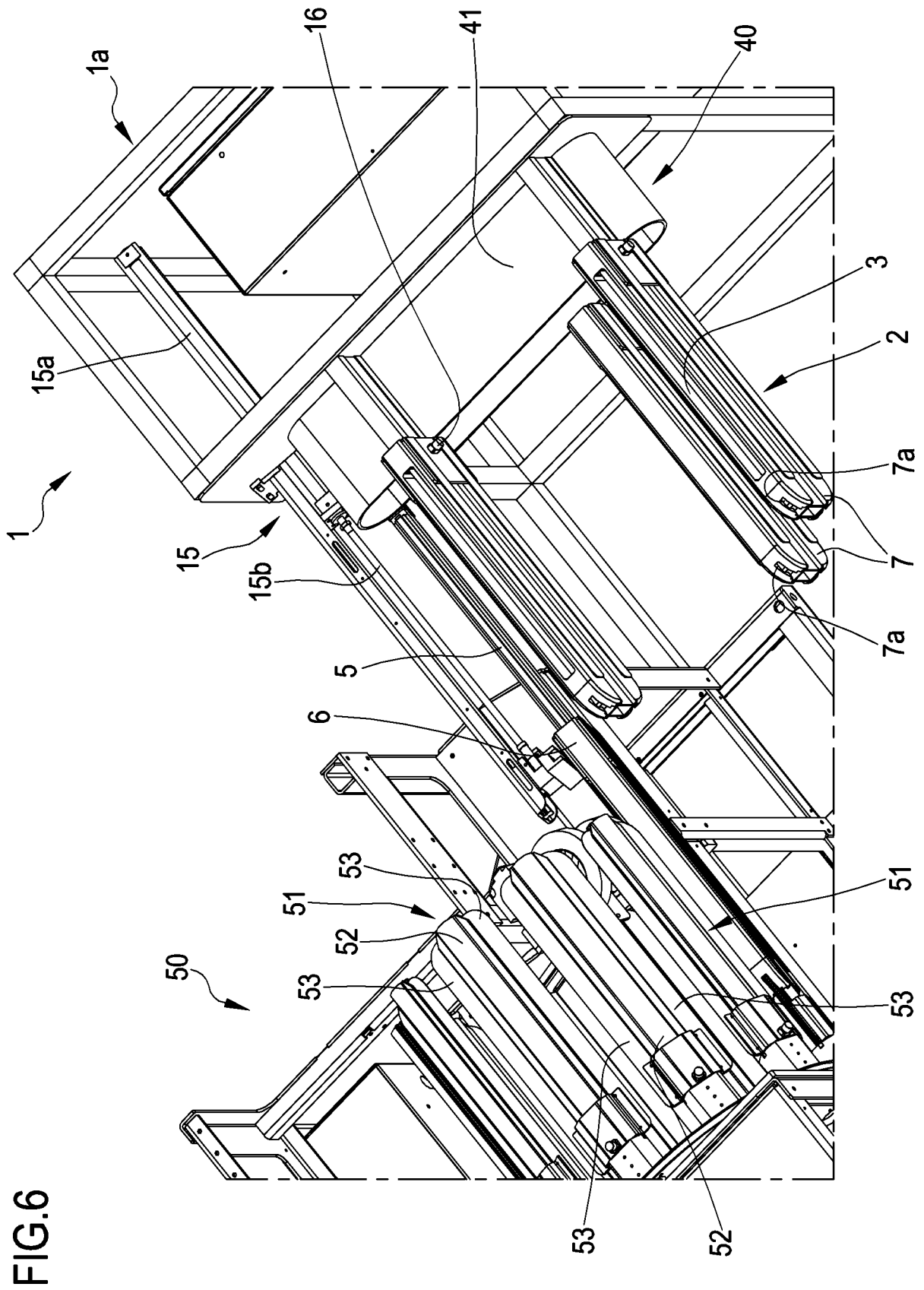
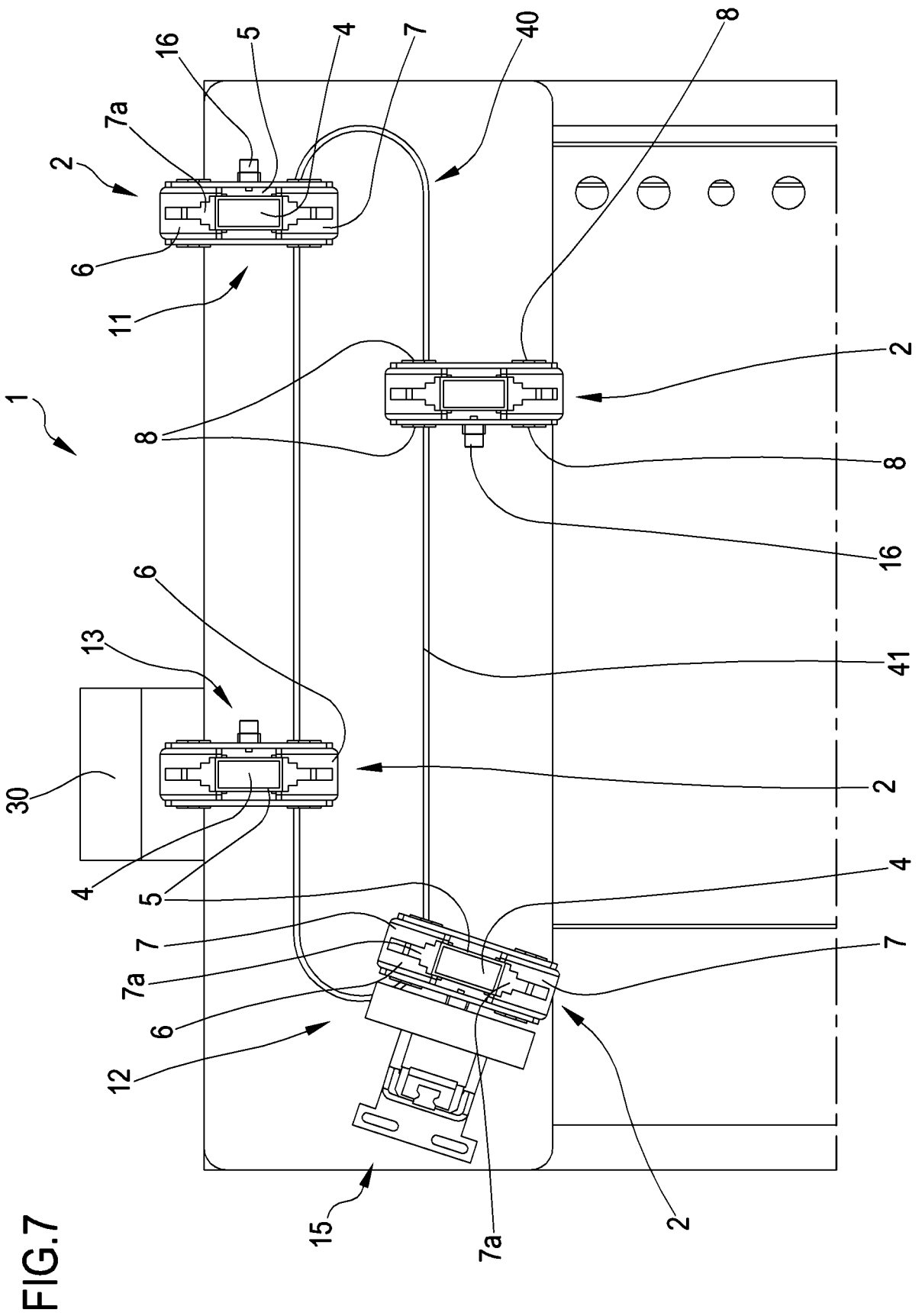


FIG.4







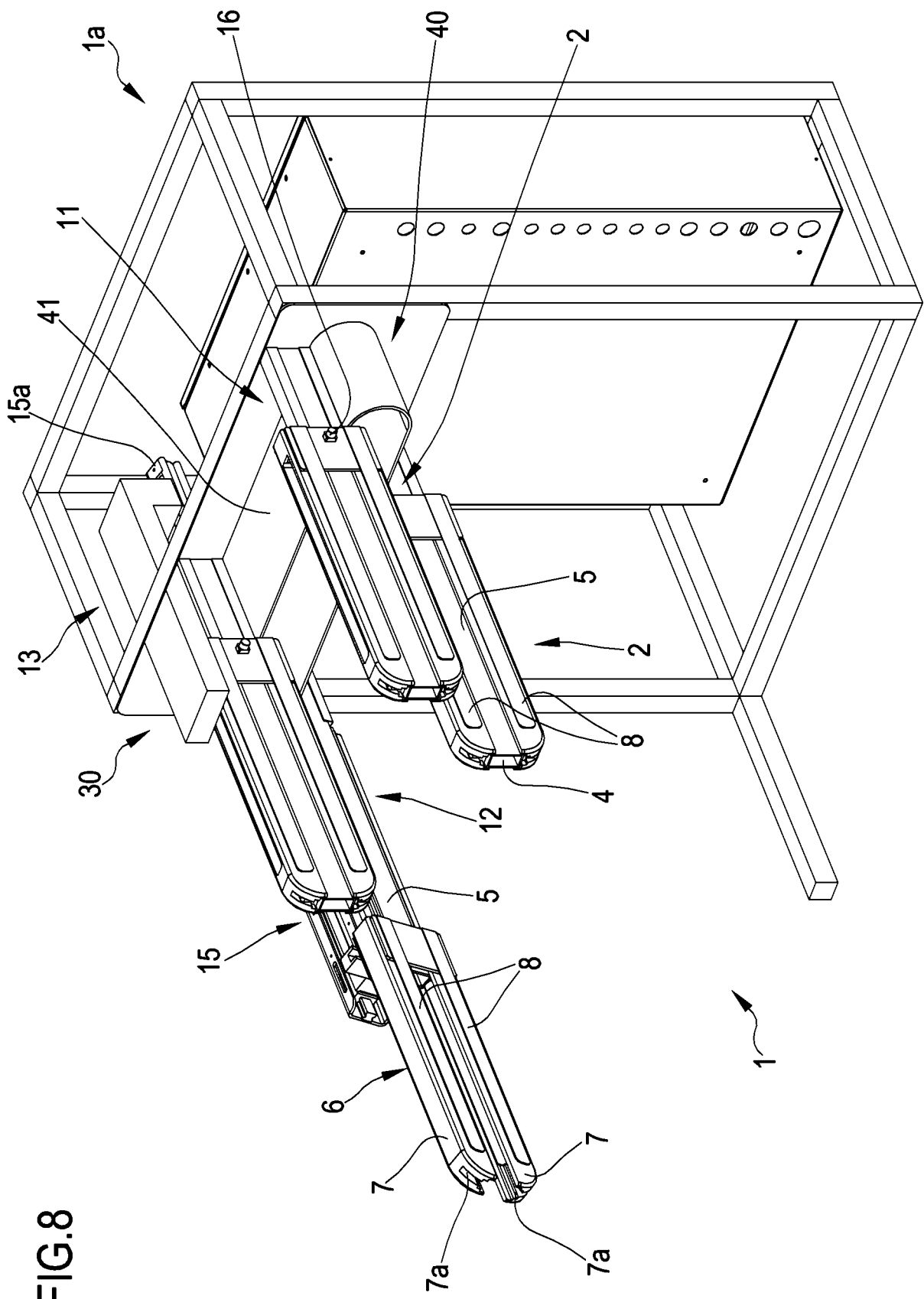


FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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