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(54) **DEVICE AND PROCESS FOR FIXING A YARN ON A TEXTILE REEL**

(57) The device (1) for fixing a yarn (8) on a textile reel (10) comprises a base (2) for supporting a first column (3), supporting a yarn positioning unit (4), and supporting a second column (5) supporting both a suction unit (6) for suction of a free end (7) of said yarn and a blocking unit (9) for blocking said free end, first and second feed means (11) and (16) being also provided for the movement of said suction and blocking units.

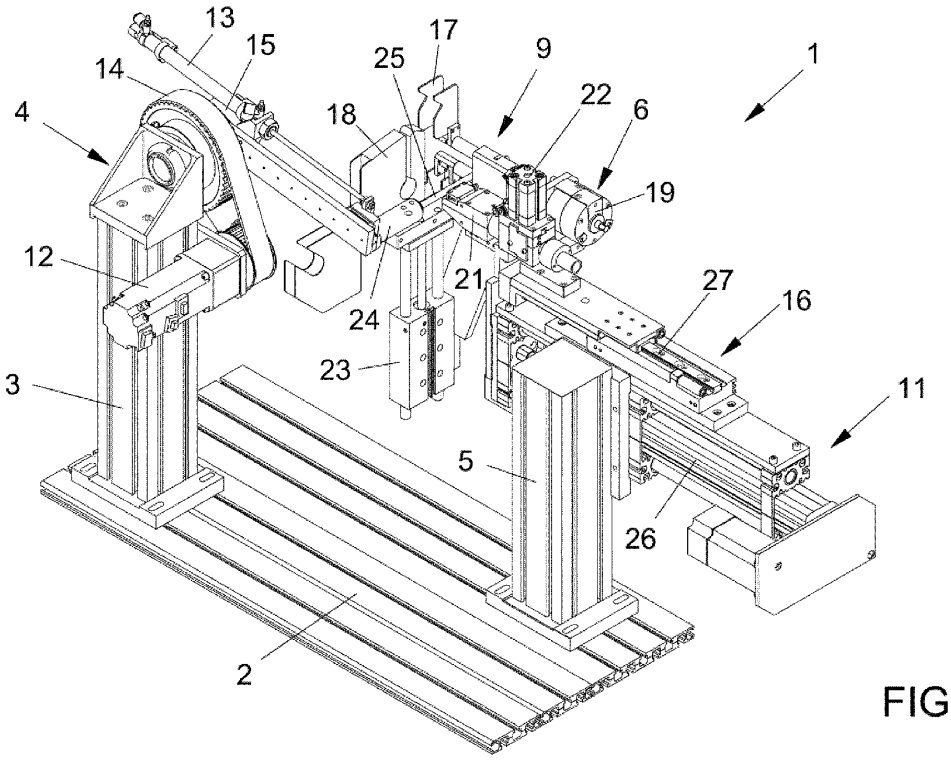

FIG.1

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a device and a process for fixing a yarn on a textile reel.

[0002] As is known, currently, in order to prevent the outer loops from coming off the reel following spinning, spooling or twisting processes or following production processes that entail winding a yarn on support tubes resulting in the end of the yarn being free, yarns are manually fixed on textile reels by the operators in charge of unloading the semi-finished products from the production lines, who knot the free end of the yarn on the outer surface of the reel.

[0003] This operation is necessary since all the operations for winding a yarn on support tubes are carried out with the reels rotated on a horizontal axis whereas most of the subsequent movements of the production process require the reels to be oriented on a vertical axis, especially in the case of artificial yarns.

[0004] In the light of the above, in many production departments, automatic devices for blocking the yarn on the textile reel are essential in order to automate the entire process of removing the reel and housing it on the pallet, making them fundamentally important in the manufacture of robot stations.

[0005] The publication JP H08 319062 A describes a process and a device for fixing the free end of the yarns, without damaging the fabric. The patent US 5 356 085 A describes a process and relative equipment for picking up and securing the ends of the yarns. The publication JP H06 135629 A describes a device for the automatic treatment of a package with different shapes and the publication JP H07 97143 A describes a method and equipment for winding yarns on a surface layer.

SUMMARY OF THE INVENTION

[0006] In addition to speeding up the process, automation also provides considerable savings, avoiding, as far as possible, skilled labour costs and a significant percentage of human errors.

[0007] The aim of the present invention is therefore to provide a device and a process for fixing a yarn on a textile reel to automatically prepare the reels of yarn, both natural fibres and synthetic products, for the subsequent operations, such as unloading from the machines and/or their arrangement on pallets, the external loops of yarn being sufficiently retained on the outer surface of the reel.

[0008] In the context of this aim, an object of the invention is to provide a device and a process for automatically fixing a yarn on a textile reel to prevent the outer loops from coming off the reel following production processes that entail winding a yarn on support tubes, resulting in the end of the yarn being free.

[0009] A further object of the invention is to provide a device and a process for automatically fixing a yarn on a textile reel to eliminate completely the manual operation of knotting the free end of the yarn on the outer surface of the reel carried out by the operators in charge of unloading the semi-finished products from the production lines.

[0010] A further object of the invention is to provide a device and a process for automatically fixing a yarn on a textile reel which has extreme flexibility of use in relation to the different possible textile sectors of application (carpet, artificial grass, tyre cord, cotton, wool, filaments) and use in relation to the different types of lines with which it could be used (twisting, cabling, winding, spinning and extrusion machines).

[0011] Last but not least, a further object of the invention is to provide a device to allow considerable savings on skilled labour, resulting in lower production costs and fewer human errors.

[0012] This aim and these and other objects are achieved by a device for fixing a yarn on a textile reel characterised in that it comprises a supporting base for supporting a first column supporting a yarn positioning unit and a second column supporting a suction unit for suction of a free end of said yarn and a blocking unit for blocking said free end, first and second feed means being provided for the movement of said suction unit and said blocking unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] These characteristics and the advantages of the invention will become clearer from the following indicative and non-limiting description of preferred but non-exclusive embodiments of a device for fixing a yarn on a textile reel illustrated in the following figures, in which:

Figure 1 shows a perspective view of the device for fixing a yarn on a textile reel according to the invention;

Figure 2 shows the device for fixing a yarn on a textile reel in which the suction unit and the yarn stop cylinder are close to the reel according to the invention;

Figure 3 shows suction of the end of the yarn by the suction unit according to the invention;

Figure 4 shows the idle roller and the yarn pulling element adapted to form a noose on the yarn according to the invention;

Figure 5 shows gripping of the yarn and noose formed thereon by the jaws according to the invention;

Figure 6 shows introduction of the yarn and noose into the tape sealing machine according to the invention.

DETAILED DISCLOSURE OF PREFERRED EMBODIMENTS

[0014] With particular reference to the figures described above, the device is indicated as a whole by the

number 1.

[0015] In particular, the device for fixing a yarn on a textile reel 10 comprises a base 2 for supporting a first column 3 supporting a yarn positioning unit 4 and a second column 5 supporting both a suction unit 6 for the suction of a free end 7 of the yarn 8 and a blocking unit 9 for blocking said free end.

[0016] The presence of first and second feed means, generally indicated by numbers 11 and 16, allows horizontal movement of the suction unit and the blocking unit towards and away from the reel 10.

[0017] The positioning unit comprises a motor 12 for rotating an approach cylinder 13 by means of a drive belt 14.

[0018] The presence of pulleys allows the reel 10 to be engaged in rotation by a reel holder spindle 15.

[0019] The positioning unit furthermore has an idle roller 24 coaxially supporting a yarn pulling element 25, both being rotated around the reel by the approach cylinder 13 so as to form, with the yarn 8, a noose 29.

[0020] The suction unit comprises a jaw unit 17 adapted to engage with the yarn to convey it externally and internally to a tape sealing machine 18.

[0021] The jaws 17 are moved by the second feed means 16.

[0022] The suction unit further comprises a motor 19 for opening and closing the jaws and a yarn suction unit 21.

[0023] Once the presence of the yarn in the yarn suction channel has been detected, a cylinder 22 stops it so as to form, by rotation of the approach cylinder around the reel, a noose 29 on the yarn which is subsequently blocked by means of the adhesive tape of the sealing machine 18.

[0024] The sealing machine is moved up and down with respect to the base 2 by means of a descent and ascent cylinder 23.

[0025] In particular, the first and second feed means comprise a first and a second slides, indicated by numbers 26 and 27, respectively, sliding horizontally and parallel to the base, adapted to translate the suction unit and the yarn stop cylinder towards and away from the reel.

[0026] The present invention also concerns a process for fixing a yarn on a textile reel.

[0027] The process consists in moving adjacent to a reel 10 by means of a first slide 26, a yarn suction unit 6 and a yarn blocking unit 9, having a tape sealing machine 18.

[0028] Assuming that the free end 7 or free head of the yarn 8 is in the central part of the reel 10, the first operation performed automatically by the equipment consists in moving the suction unit 6 and the blocking unit 9 adjacent to the reel 10, by means of the first slide 26.

[0029] Simultaneously with said movement, the reel 10 is rotated by a spindle 15 until the free head 7 is found by the suction unit 21 and conveyed in a channel inside which a suitable capacitive sensor (not shown) detects the presence thereof, causing the yarn stop cylinder 22 to intervene.

[0030] At the end of this second phase, the whole suction unit and blocking unit move back to the rest position, by means of the first slide 26, so as to create a stock of yarn 8.

[0031] In this phase the positioning unit 4 for positioning the yarn 8, consisting of a pulling element 25 and an idle roller 24, intervenes.

[0032] These two elements are mounted coaxially on a guide which is radially movable with respect to the rotation axis of the reel and operated by a pneumatic approach cylinder 13, the purpose of which is to keep the pulling element 25 and the idle roller 24 always adjacent to the surface of the reel 10 regardless of the external diameter thereof.

[0033] Once the pulling element 25 has reached the correct work position, it is made to rotate 360° anticlockwise around the reel by means of the motor 12 and the belt 14 in order to open the last loop of the yarn 8 and form the noose 29 necessary for blocking the yarn on the reel.

[0034] The motor 19 causes intervention of the jaws 17 which are used to keep the three yarns - the two of the noose 29 and the yarn 8 retained by the stop cylinder 22 - further fixed and correctly aligned, before all three are blocked by the adhesive tape in the sealing machine 18.

[0035] The second slide 27 places the jaws 17 near the reel, then by means of the motor 19 they are closed; lastly, the jaws are moved adjacent to the outer surface of the yarn on the reel to create the correct blocking condition.

[0036] Once the phase of alignment and blocking of the three yarns has been completed, the tape sealing machine 18 is raised to the work position by means of the pneumatic ascent-descent cylinder 23 between the jaws 17 with the consequent final taping of the three yarns.

[0037] In this phase the reel 10 can be removed from the device and the taping machine can be lowered.

[0038] In the meantime, the jaws 17 have reopened, and can be retracted.

[0039] The approach cylinder can be reset to the rest position and the process can restart as soon as a new reel is unloaded from the production machine and presented to the device.

[0040] The device and the process subject of the invention are particularly advantageous for automatically fixing a yarn on textile reels to prevent the outer loops from coming off following production processes that entail winding a yarn on support tubes resulting in the end of the yarn being free.

[0041] The invention thus conceived is subject to numerous variations all falling within the inventive concept.

[0042] Any materials can be used as required.

Claims

1. A device (1) for fixing a yarn (8) on a textile reel (10), said device comprising a base (2) for supporting a first column (3), supporting a yarn positioning unit (4), and supporting a second column (5) supporting both a suction unit (6) for suction of a free end (7) of said yarn and a blocking unit (9) for blocking said free end, first and second feed means (11) and (16) being also provided for the movement of said suction and blocking units, wherein said positioning unit (4) comprises a motor (12) for rotating an approach cylinder (13) around said reel by means of at least one drive belt (14), a pulley assembly being provided adapted to engage said reel in rotation by means of a reel holder spindle (15), **characterized in that** said positioning unit comprises an idle roller (24) supporting a yarn pulling element (25) and a tape sealing machine (18) for sealing said yarn, and **in that** said suction unit (6) comprises a group of jaws (17) activated by said second feed means and adapted to engage with at least said yarn.

2. The device for fixing a yarn on a textile reel, according to claim 1, **characterized in that** said suction unit comprises a motor (19) for opening and closing said jaws.

3. The device for fixing a yarn on a textile reel, according to claim 2, **characterized in that** said suction unit comprises a yarn suction unit (21) and a yarn stop cylinder (22), a descent and ascent cylinder (23) of said stop cylinder and said suction unit being also provided.

4. The device for fixing a yarn on a textile reel, according to one or more of the preceding claims, **characterized in that** said first and second feed means comprise a first and a second slides (26) and (27) sliding horizontally and parallel to said base.

5. The device for fixing a yarn on a textile reel, according to one or more of the preceding claims, **characterized in that** said approach cylinder of said idle roller rotates around said reel.

6. A process for fixing a yarn on a textile reel which entails moving suction and blocking units (6) and (9) of the yarn (8) adjacent to a reel (10) by means of a first slide (26), rotating said reel simultaneously with said approach until a free end (7) of said yarn is detected by a suction unit (21) which conveys it in a channel inside which a capacitive sensor detects the presence thereof, causing the intervention of a yarn stop cylinder (22), wherein subsequently said suction and blocking units move back by means of a second slide (27) to a rest position to create a stock of said yarn, an approach cylinder (13) being made to rotate around said reel to open a last loop of said yarn in order to form a noose (29) necessary for blocking said yarn on said reel, **characterized in that** it consists in activating one or more jaws (17) to keep said yarn (8) and a first and a second yarns forming said noose (29) fixed and correctly aligned, and in blocking with an adhesive tape, by means of a sealing machine (18), said yarn and said first and second yarns forming said noose (29).

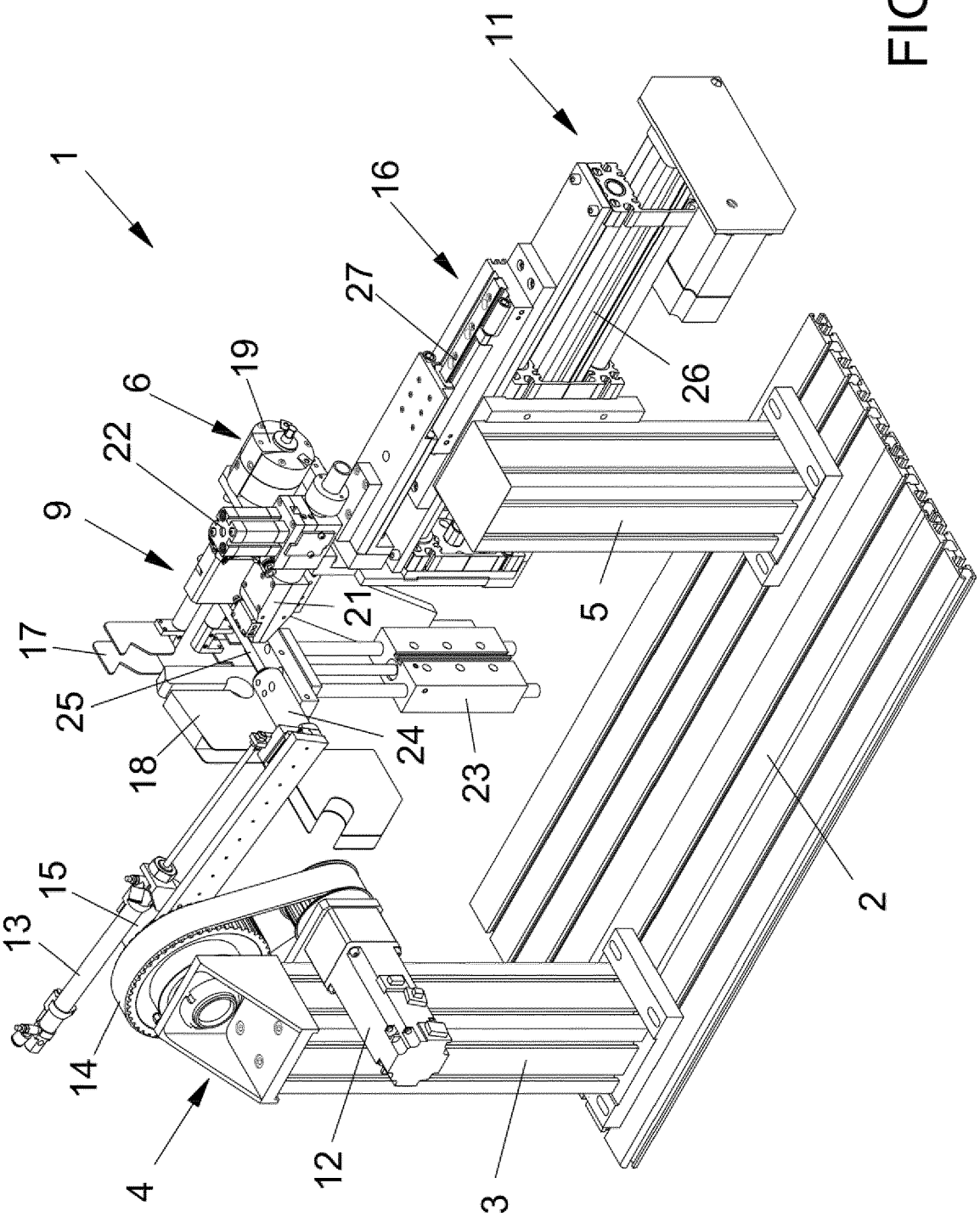

FIG.1

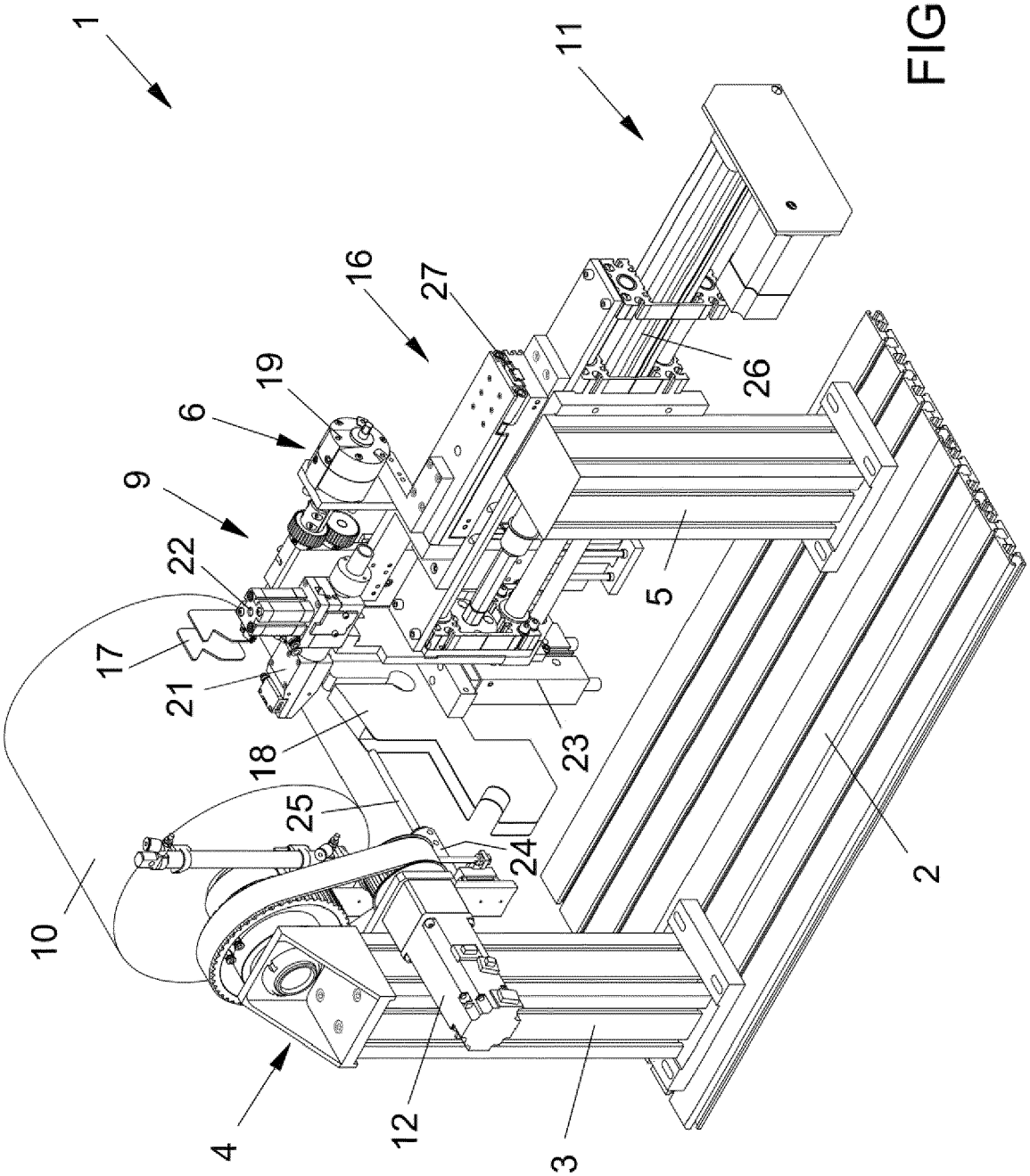

FIG.2

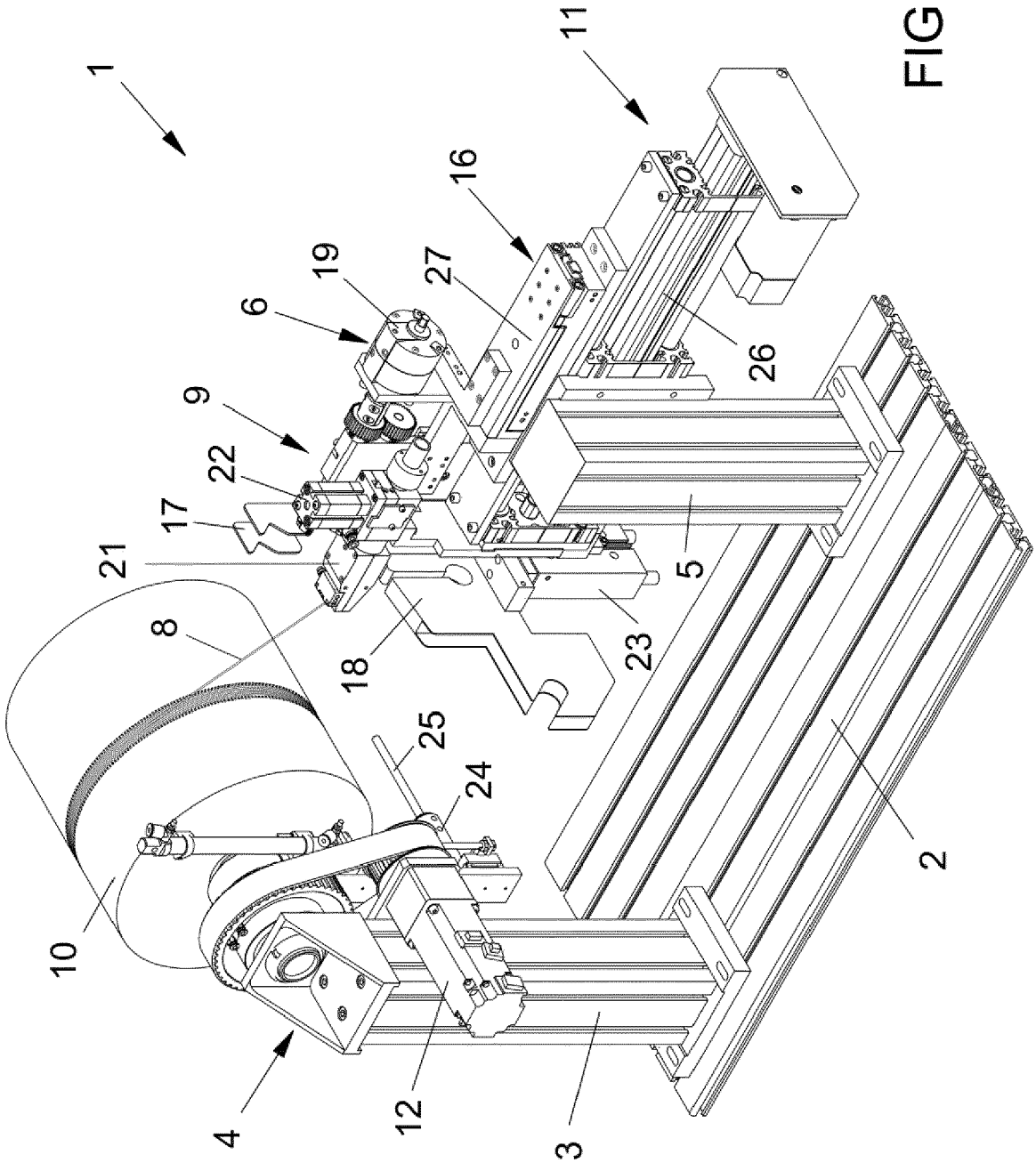

FIG.3

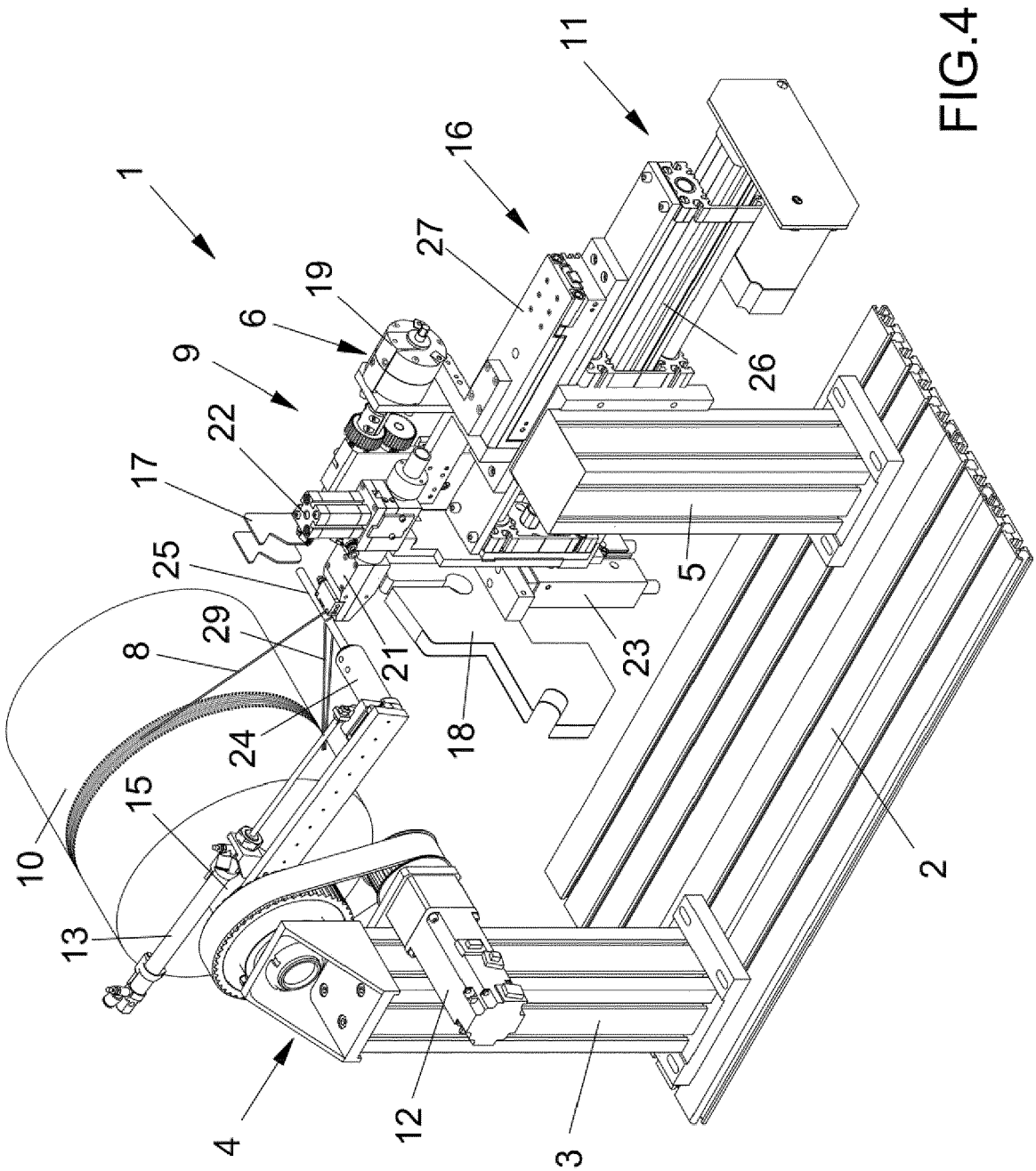

FIG.4

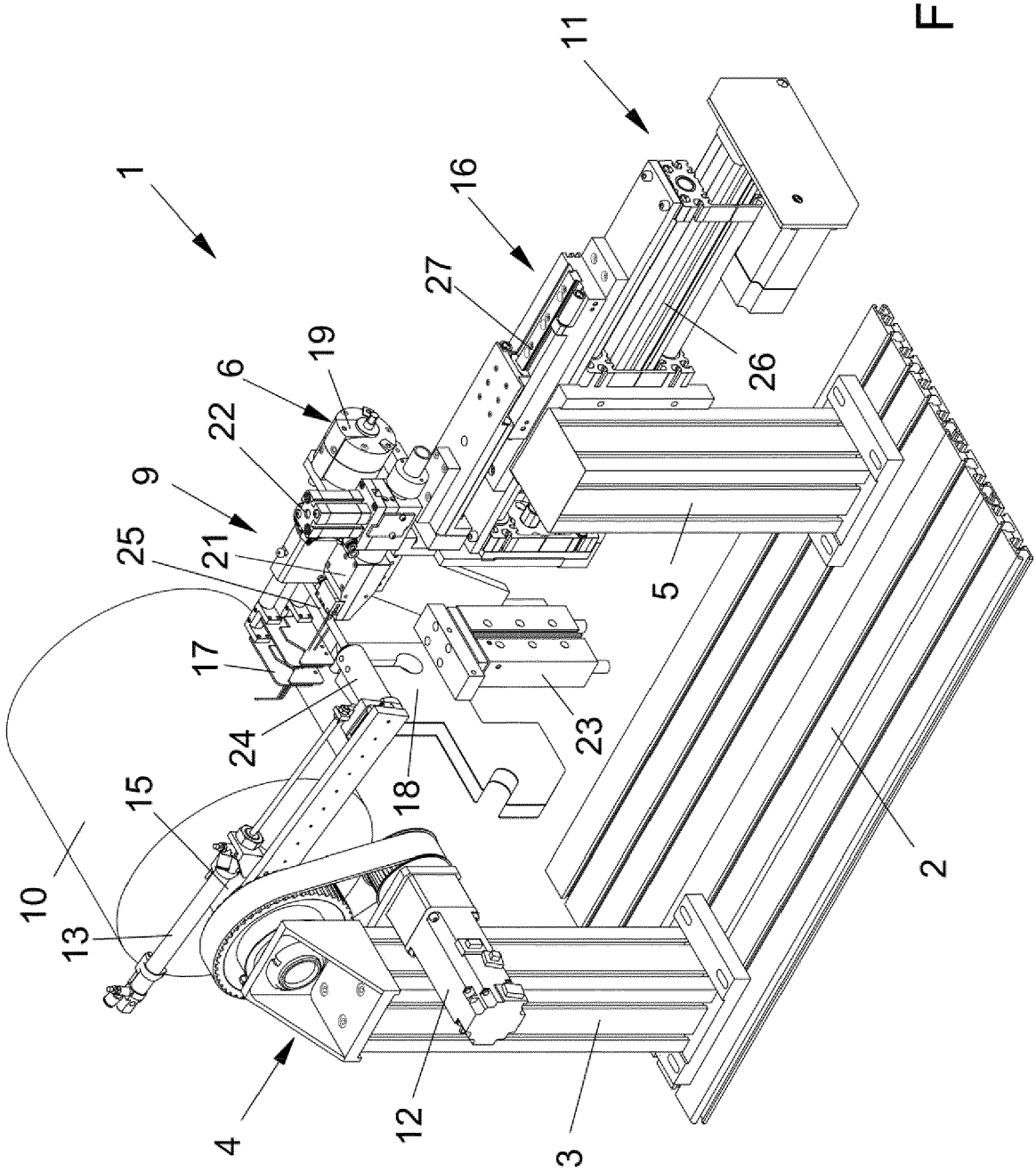

FIG.5

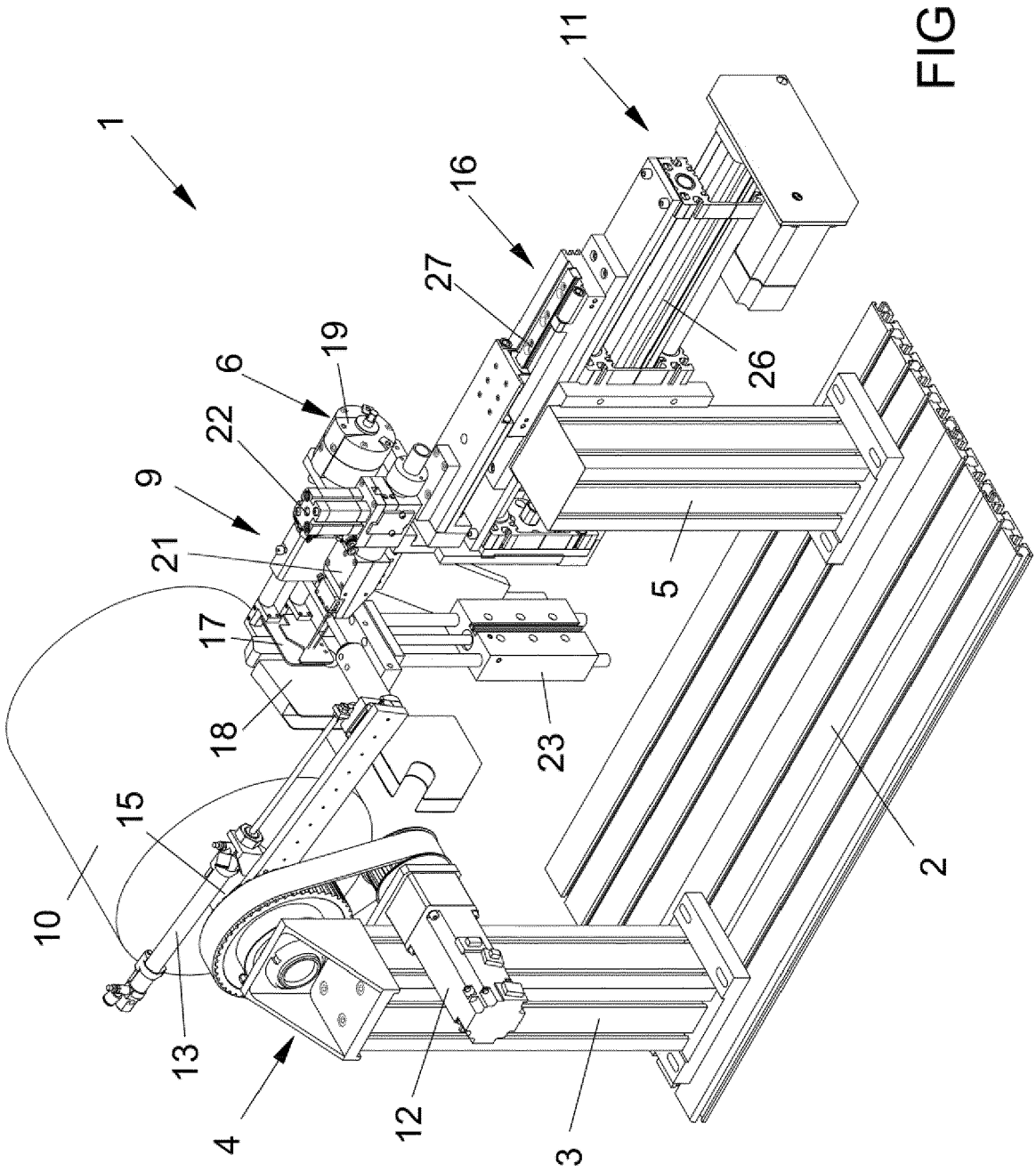

FIG.6

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EUROPEAN SEARCH REPORT

Application Number
EP 23 16 6736

DOCUMENTS CONSIDERED TO BE RELEVANT

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TECHNICAL FIELDS SEARCHED (IPC)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	9 August 2023	Lemmen, René

CATEGORY OF CITED DOCUMENTS

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09-08-2023

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REFERENCES CITED IN THE DESCRIPTION

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