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(71) Applicants:
- **Bianchi, Enrico**
  27025 Gambolo (Pavia) (IT)
- **Bianchi, Maria Paola**
  27025 Gambolo (Pavia) (IT)

(72) Inventors:
- **Bianchi, Enrico**
  27025 Gambolo (Pavia) (IT)
- **Bianchi, Maria Paola**
  27025 Gambolo (Pavia) (IT)

(74) Representative: **Leihkauf, Steffen Falk et al**
Jacobacci & Partners S.p.A.
Via Senato, 8
20121 Milano (IT)

(54) DISPENSER DEVICE TO MELT AND PROVIDE HOT MELT GLUE FOR AUTOMATIC GLUING SYSTEMS, AND AUTOMATIC GLUING SYSTEM COMPRISING SAID DISPENSER DEVICE

(57) A dispenser device (1) to melt hot melt solid glue as a wire (30, 130) and to dispense molten glue starting from said hot melt solid glue as a wire, comprising A) a first wire feeding unit (100) comprising a first dragging mechanism (40) for a first solid glue wire (30), a first motor (75) associated with said first dragging mechanism (40); a first connection member (60) made of a thermally insulating material having a tubular shape defining an inner passage (66) for said first solid glue wire (30); B) at least one further wire feeding unit (200) comprising a further dragging mechanism (140) for a further solid glue wire (130), a further tubular connection member (160) made of a thermally insulating material defining an inner passage (166); C) a melter body (20) having a first inlet (21) for said first solid glue wire (30) and at least a second inlet (121) for said at least one further solid glue wire (130), said melter body (20) comprising heating members to melt the first solid glue wire (30) and the at least one further solid glue wire (130); D) at least one dispensing nozzle (70) for molten glue, secured to said melter body (23); E) at least one opening/closure valve (90), driven actuation means (92) to actuate said valve.

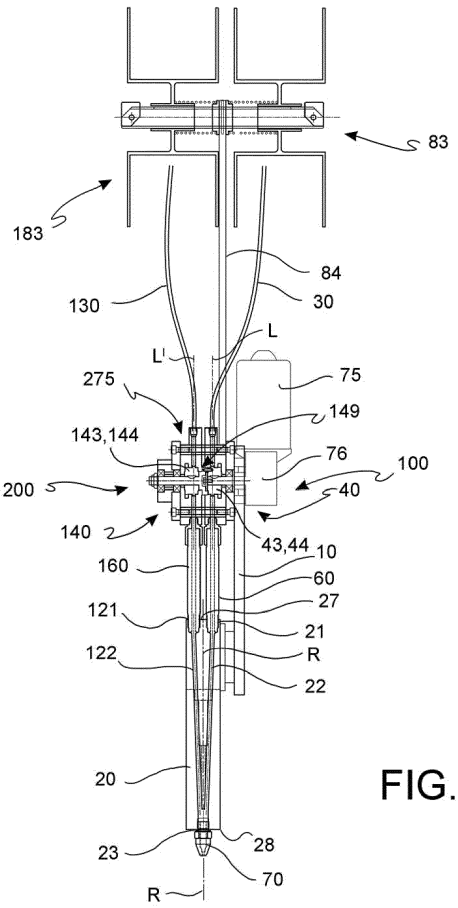

FIG. 5

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Description

Field of the invention

[0001] The present invention relates to a dispenser device to melt and dispense hot melt glue starting from a hot melt solid glue as a continuous wire, for example for an automatic glueing system. More specifically, the invention relates to an interchangeable device, easily mountable to/removable from a support structure of an automatic glueing system, or for a glueing machine. The present invention further relates to an automatic glueing system comprising one or more of said interchangeable devices mounted to said system. For example, said glueing system is configured to carry out some processing/glueing steps of pleated filter media.

Background art

[0002] In the field of industrial production of processed products having glued portions, glueing machines are known, which receive an incoming solid hot melt glue wire, melt it continuously thus forming molten glue, and dispense such a molten glue at an output for gluing the processed product.

[0003] Such machines generally comprise a device for feeding the hot melt glue wire, arranged upstream of a melter body, which is adapted to melt such a wire thus forming molten glue, and to provide such a molten glue at the output. Such machines further include a support for a reel of hot melt solid glue wire upstream of the wire feeding device.

[0004] As a result, such known machines are particularly specific and cumbersome and, if any, allow few changes in layout.

[0005] Moreover, the melting of a continuous hot melt glue wire is a rather delicate process requiring a controlled heating of the wire itself, so as to obtain a molten wire at the output with a predetermined consistency but above all, not to alter the physical properties of solidification of the molten glue, of adhesion strength or mechanical seal of the solidified glue after said melting step.

[0006] When the hot melt solid glue wire, which is delimited by an outer surface, for example cylindrical in shape, passes through a passage within a melter body, it receives an amount of heat from the melter body which passes through the outer surface of the solid glue wire and gradually penetrates into the interior of the same, which begins to melt from the outside inwards according to a melting rate which depends on the amount of heat supplied and on the diameter of the glue wire. Generally, the greater the wire diameter, the longer the time required for the complete melting of the wire. Simultaneously, the wire is fed along the passage in the melter body according to a predetermined feeding speed, on which the residence time of the hot melt glue wire inside the melter body depends.

[0007] Accordingly, the melting rate of a length unit of the hot melt glue wire is related to the amount of heat supplied in the time unit, the diameter of the wire and the feeding speed.

[0008] A maximum value of such a melting rate is determined by the chemical and physical features of the material forming the hot melt slid glue wire, and therefore it forms a technological barrier which, if exceeded, alters the chemical-physical-structural features of the solidified glue after said melting step.

[0009] However, in the industrial field of the automatic glueing of products, depending on the specific application, a rather high molten glue temporal rate may be required.

[0010] Since the above-mentioned melting rate technological barrier cannot be exceeded, in order to increase the molten glue temporal rate it is only possible to adjust the diameter of the hot melt solid glue wire and the feeding rate of the same into the melter body.

[0011] In the first case, i.e. if the diameter of the hot melt solid glue wire is increased, in order to allow it to be melted completely, the residence time of the wire into the melter body should be increased. This can be achieved either by reducing the wire feeding speed into the melter body or by making a melter body with an inner passage for the solid wire which extends by a greater length. If the feeding speed is reduced, the advantage due to the greater diameter of the wire is reduced or canceled, and therefore the molten glue rate does not benefit therefrom; if the length of the passage for the solid glue wire in the molten body is increased, a large melter body must be made, which is therefore too bulky and heavy to be used on a device easily interchangeable and mountable/dismountable to/from a support structure of an automatic glueing system.

[0012] In the second case, i.e. if the solid glue wire feeding rate into the melter body is increased, since said melting rate barrier cannot be exceeded, it is only possible to increase the length of the solid glue wire path within the melter body, falling in the drawbacks just described above.

[0013] A melter body with an inner path which extends by a considerable length, in addition to involving the drawback of being excessively bulky and heavy for a removable and interchangeable device, would also entail the drawback of requiring a greater heating energy of the melter body due to the greater volume to be heated.

[0014] Therefore, known devices do not allow a high temporal flow rate of molten glue to be obtained and simultaneously limit the overall dimensions and the weight of the device.

Summary of the invention

[0015] It is an object of the present invention to devise and provide a device for melting and dispensing molten hot melt glue starting from a hot melt solid glue wire for automatic gluing systems which allows the above requirements to be met and the drawbacks mentioned

above with reference to the prior art to be at least partially obviated.

[0016] Therefore, it is an object of the present invention to provide an interchangeable dispenser device for melting and dispensing molten hot melt glue starting from a hot melt solid glue wire, at a high flow rate of molten glue and with small overall dimensions and reduced energy consumption.

[0017] In particular, it is an object of the present invention to provide a device for melting and dispensing molten hot melt glue for automatic glueing systems which allows a high flow rate of molten hot melt glue to be obtained while having reduced overall dimensions and weight.

[0018] Therefore, it is an object of the invention to provide a device for melting and dispensing molten hot melt glue for automatic glueing systems which is easily interchangeable and easily mountable to a structure of an automatic production or glueing system and which has a high dispensing rate of molten glue.

[0019] It is yet another object of the invention to provide a device for melting and dispensing molten hot melt glue for automatic glueing systems which is self-contained in an interchangeable unit and which has a high dispensing rate of molten glue.

[0020] It is a further object of the present invention to provide an automatic glueing system comprising a structure and at least one device for melting and dispensing hot melt glue interchangeably mounted to the structure, in which such a system is capable of dispensing a large amount of molten glue while being easily reconfigurable.

[0021] These and further objects and advantages are achieved by a device for melting and dispensing molten hot melt glue at a high flow rate for an automatic glueing system, as well as by an automatic glueing system comprising such a device, according to the appended claims.

[0022] Advantageously, the provision of a plurality of wire feeding units connected to a single melter body allows a plurality of molten hot melt glue wires to be introduced into the dispenser device, thereby increasing the flow rate of molten glue at the output, keeping the overall dimensions of the device extremely small, so it can be quickly mounted to a structure of an automatic system or so as to easily change the configuration of such a system.

[0023] Advantageously, the provision of a single melter body for more than one wire feeding unit further allows the overall heat exchange surface between the melter body and the incoming solid glue wires to be increased, with equal thermal power generated. In other words, an optimized use of the thermal energy is achieved without requiring a substantial increase in the overall dimensions of the melter body.

[0024] Advantageously, the provision of a plurality of wire feeding units connected to a single melter body allows even further significant advantages to be achieved, such as for example the possibility to simultaneously dispense different types of molten glue separated from one another, in the case of separate passages of the melter body, or the possibility of dispensing a mixture of different glues, hot-mixed inside the melter body, in the case of incident or communicating melter body passages.

Brief description of the drawings

[0025] Further features and advantages of the present invention will become readily apparent from the following description of preferred exemplary embodiments thereof, given by way of non-limiting example, with reference to the accompanying drawings, in which:

- figure 1 shows a front view of a dispenser device according to the invention having two wire feeding units and two motors;
- figure 2 shows an orthogonal side view of the device in figure 1;
- figure 3 shows a bottom view of the device in figure 1;
- figure 4 shows an enlarged partial view of the view in figure 1;
- figure 5 shows a front view of another dispenser device according to the invention having two wire feeding units and one motor;
- figure 6 shows an enlarged partial view of the view in figure 5;
- figure 7 shows an enlarged partial view of figure 1 which shows a first dragging mechanism of a first feeding unit;
- figure 7A shows a sectional view of a dragging mechanism of a single feeding unit of the device in figure 1;
- figure 8 shows an enlarged partial view of figure 2 comprising a melter body;
- figure 9 shows an enlarged partial view of figure 5 comprising a melter body;
- figure 10 shows a lateral view of an automatic glueing system having two dispenser devices as described above, of the type with a single motor;
- figure 11 shows a front view of the glueing system in figure 10;
- figure 12 shows a top view of the glueing system in figure 10.

Description of some preferred embodiments

[0026] With reference to the figures, a dispenser device for melting hot melt solid glue as a wire (30, 130) and dispensing molten glue starting from said hot melt solid glue as a wire according to the invention, is globally designated by reference numeral 1.

[0027] The dispenser device 1 comprises a first wire feeding unit 100 and at least one further wire feeding unit 200, a single melter body 20 connected to all the wire feeding units 100, 200 for melting the hot melt glue as a wire when said glue passes therethrough, at least one dispensing nozzle 70 for molten glue associated with, for example secured to, a melter body outlet 23, at least one opening/closure valve 90 for allowing or preventing the flow of molten glue through the at least one melter body

outlet 23, for example through the dispensing nozzle 70.

[0028] The first wire feeding unit 100 comprises a first dragging mechanism 40 comprising an inner passage 47, 48 having an inlet 41 and an outlet 42 for a first solid glue wire 30, dragging members 43, 44 arranged to drag said first solid glue wire 30 from said inlet 41 to said outlet 42 through said inner passage 47, 48 applying a dragging force to said first solid glue wire 30.

[0029] According to an embodiment, the dragging members 43, 44 are a pair of rollers comprising a driving roller 44 and a driven roller 43 arranged with rotation axes 38, 39 parallel to each other and operatively pressing one against the other in a direction orthogonal to such rotation axes 38, 39.

[0030] The pair of rollers 43, 44 is adapted to operatively receive the first solid glue wire 30 interposed between the driving roller 44 and the driven roller 43 to drag said first solid glue wire 30 through the rotation of said pair of rollers.

[0031] According to an embodiment, the dragging mechanism 40 comprises a motor 75, for example a gearmotor comprising a motor 75 and a reduction gear 76, having a rotary shaft 77 mechanically connected to the driving roller 44 so as to bring it into rotation. Motor 75 is for example an electric motor, for example a brushless motor, or for example a three-phase motor. Alternatively, motor 75 may be a pneumatic or hydraulic motor.

[0032] According to an embodiment, motor 75 is mounted with its shaft arranged in a direction substantially orthogonal to the rotation axis 39 of the driving roller. Thereby, the transverse dimension of the dispenser device remains contained.

[0033] According to an embodiment, the driving roller 44 comprises a driving wheel 44' coaxial to and integral with the driving roller 44, and the driven roller 43 comprises a driven wheel 43' integral to and coaxial with the driven roller 43, where the driving wheel 44' and the driven wheel 43' are configured and arranged so that the driving wheel 44' transmits the motion to the driven wheel 43'. For example, the driving wheel 44' and the driven wheel 43' are toothed wheels configured so as to transmit the motion even if the distance between the rotation axes varies slightly.

[0034] According to one embodiment, both the driving roller 44 and the driven roller 43 have a shaped profile 44", 43" so as to transmit a sufficient static friction force to the interposed solid glue wire 30 to drag such a solid glue wire 30, for example such a shaped profile 44", 43" has a concave section towards the exterior, such as semicircular.

[0035] According to an embodiment, the dragging mechanism 40 comprises an inlet guiding member 45 having an inner conduit 47 adapted to be crossed by the solid glue wire 30, in which such an inner conduit 47 goes from the inlet 41 of the dragging mechanism to an outlet end portion 49' arranged close to the pair of rollers 43, 44 so as to drive the solid glue wire 30 in a guided fashion in inlet to said pair of rollers 43, 44. The inner conduit 47 forms a part of the inner passage 47, 48 of the dragging mechanism 40.

[0036] According to an embodiment, the dragging mechanism 40 comprises an outlet guiding member 46 having an inner conduit 48, adapted to be crossed by said solid glue wire 30, where such an inner conduit 48 goes from an end portion 49" arranged close to said pair of rollers 43, 44 so as to receive said solid glue wire 30 coming out of said pair of rollers 43, 44, up to outlet 42 of the dragging mechanism 40. The inner conduit 48 forms a part of the inner passage 47, 48 of the dragging mechanism 40.

[0037] In other words, the inlet guiding member 45 and/or the outlet guiding member 46 are configured so as to accurately drive the solid glue wire 30 between the driving 44 and driven 43 rollers, in particular at the shaped profiles 44", 43".

[0038] According to an embodiment, the dragging mechanism 40 comprises a controller 80 of force exerted between the driving roller 44 and the driven roller 43.

[0039] Controller 80 comprises, for example, means for changing the distance between axes 38, 39 of the driving roller 44 and of the driven roller 43.

[0040] According to an embodiment, the means for changing the distance comprise a roller holding member 37, rotatably supporting one between the driving roller 44 and the driven roller 43, wherein the roller holding member 37 is hinged, in a first end thereof, to a fixed base 81 of the dragging mechanism 40, about a hinge axis 36 substantially parallel to axes 38, 39 of the driving roller 44 and of the driven roller 43.

[0041] According to an embodiment, the means for changing the distance comprise an adjustment knob 82 rotatable about an axis 83 substantially orthogonal to the hinge axis 36 and substantially parallel to a plane passing through axes 38, 39 of the driving roller 44 and of the driven roller 43, so that by tightening or loosening the adjustment knob 82 the distance between axes 38, 39 of the driving roller 44 and of the driven roller 43 is reduced or increased, respectively.

[0042] In an alternative embodiment, a different type of dragging mechanism 40 may be provided, for example comprising a linear actuator, not shown in the figures, for dragging the solid glue wire according to a reciprocating motion.

[0043] The first feeding unit 100 further comprises a first connection member 60 having a tubular shape defining an inner passage 66 for said first solid glue wire 30 and having a first end 61 connected to said outlet 42 of said first dragging mechanism 40 and a second end 62 opposite said first end 61, said inner passage 66 of first tubular member being aligned with said inner passage 47, 48 of first dragging mechanism, said first connection member 60 being made of a thermally insulating material.

[0044] The connection member 60 has a length, measured along the inner passage 66, substantially in the range from 20 mm to 300 mm, in particular in the range

from 30 mm to 150 mm, particularly substantially equal to 80 mm.

[0045] It was found that for a length of substantially 80 mm, the connection member 60 has high stiffness features.

[0046] According to an embodiment, the inner passage 66 of the connection member 60 is rectilinear or substantially rectilinear.

[0047] According to an embodiment, the connection member 60 is made of Teflon or of a ceramic material.

[0048] According to an embodiment, the connection member 60 is connected to the dragging mechanism 40 by means of a bush 63.

[0049] For example, the bush 63 comprises a cup-shaped portion adapted to accommodate a corresponding end 61 of the connection member 60 therein.

[0050] The bush 63 may include a threaded portion adapted to engage in a threaded hole at the outlet 42 of the dragging mechanism, respectively.

[0051] The bush 63 includes a central through hole 63' connecting the inner passage 48 of the dragging mechanism 40 and the inner passage 66 of the connection member 60 by shape continuity.

[0052] According to an embodiment, the inner diameter of the inner passage 47, 48 of the dragging mechanism 40 is substantially equal to the inner diameter of the inner conduit 66.

[0053] According to an embodiment, the bush 63 forms a seal between the connection member 60 and the dragging mechanism 40.

[0054] The at least one further wire feeding unit 200 comprises a further dragging mechanism 140 comprising an inner passage 147, 148 having an inlet 141 and an outlet 142 for a further solid glue wire 130, dragging members 143, 144 arranged to drag said further solid glue wire 130 from said inlet 141 to said outlet 142 through said inner passage 147, 148 applying a dragging force to said further solid glue wire 130.

[0055] Moreover, the at least one further wire feeding unit comprises a further connection member 160 which is tubular in shape defining an inner passage 166 for said further solid glue wire 130 and having a first end 161 connected to said outlet 142 of said further dragging mechanism 140 and a second end 162 opposite said first end 161, said inner passage 166 of further connection member 160 being aligned with said inner passage 147, 148 of said further dragging mechanism 140, said further connection member 160 being made of a thermally insulating material.

[0056] The at least one further wire feeding unit comprises actuation means 275 associated with said further dragging mechanism 140 to actuate said dragging members 143, 144 of said further dragging mechanism 140. Examples of such actuation means shall be described hereinafter.

[0057] According to an embodiment, the at least one further wire feeding unit 200 is substantially identical to said first wire feeding unit 100, for example, arranged side by side with said first feeding unit 100.

[0058] The melter body 20 has a first inlet 21 for said first solid glue wire 30 and at least one second inlet 121 for said at least one further solid glue wire 130, said first inlet 21 being connected to said second end 62 of said first connection member 30, and said at least one second inlet 121 being connected to said second end 162 of a corresponding second connection member 160, said melter body 20 having at least one melter body outlet 23 for molten glue, a first inner passage 22 connecting said first melter body inlet 21 to said at least one melter body outlet 23, at least one further inner passage 122 connecting said at least one further melter body inlet 121 to said at least one melter body outlet 23.

[0059] The melter body 20 comprises heating members to melt the first solid glue wire 30 and the at least one further solid glue wire 130 along said first inner passage 22 of the melter body and said at least one further passage 122 of the melter body.

[0060] The dispenser device comprises at least one dispensing nozzle 70 for molten glue associated with, for example secured to, said at least one melter body outlet 23.

[0061] Moreover, the dispenser device comprises at least one opening/closure valve 90 comprising an occlusion member 91 movable between a first position in which the occlusion member 91 allows the molten glue to flow through said at least one outlet 23 of the melter body, and a second position in which the occlusion member 91 prevents the molten glue from flowing through said at least one outlet 23 of the melter body, driven actuation means 92 to actuate said valve.

[0062] According to an embodiment, the inner passage 47, 48 of the first dragging mechanism 40 and the inner passage 66 of the first connection member 60 form a continuous conduit extending along a first substantially straight extension line L.

[0063] According to an embodiment, the inner passage 147, 148 of the at least one further dragging mechanism 140 and the inner passage 166 of the at least one further connection member 160 form a corresponding continuous conduit extending along at least one further substantially straight extension line L'.

[0064] According to an embodiment, said first extension line L and said at least one further extension line L' are substantially mutually parallel.

[0065] According to an embodiment, the melter body 20 has a main extension direction R substantially parallel to the first extension line L, said melter body 20 defining a rear end face 27 transversal to said first extension line L and comprising said first melter body inlet 21 and said at least one further melter body inlet 121.

[0066] The melter body 20 further defines a front end face 28 opposite said rear end face 27 comprising said at least one melter body outlet 23.

[0067] According to an embodiment, the dispenser device 1 comprises a temperature sensor in thermal contact with the melter body 20 to detect the temperature of the

inner passage 22 and/or of the at least one further inner passage 121 of the melter body 20.

[0068] According to an embodiment, said at least one opening/closure valve 90 is a pin valve mounted to the melter body 20, in which the movable occlusion member 91 is a pin member extending along a substantially straight pin line S.

[0069] According to an embodiment, the first inner passage 22 of the melter body and/or the at least one further inner passage 122 of the melter body extend along corresponding melter body passage lines (C, C').

[0070] According to an embodiment, the pin line S is oblique with respect to said melter body passage lines C, C' and incident to said melter body passage lines C, C', for example at said at least one melter body outlet 23.

[0071] According to an embodiment, said melter body passage lines C, C' are straight lines.

[0072] According to an embodiment, the dispenser device 1 comprises a single further wire feeding unit 200, in addition to the first wire feeding unit 100, in which the first inner passage 22 of the melter body and the further inner passage 122 of the melter body extend along two respective melter body passage lines C, C', straight and mutually inclined by a predetermined angle CA, for example the predetermined angle is in the range from 3° to 15°.

[0073] According to this embodiment, the pin line S may be, for example, inclined with respect to a plane passing by said melter body passage lines C, C' according to a predetermined angle SA, for example said predetermined angle SA being in the range from 5° to 35°.

[0074] According to an embodiment, the first extension line L, the second extension line L', the melter body passage lines C, C' and the main melter body extension line R belong to a same plane.

[0075] According to an embodiment, said dispensing nozzle 70 defines an inner nozzle hole 71 extending along said pin line S.

[0076] According to an embodiment, the inner nozzle hole 71 is adapted to slidably receive a free end of the movable occlusion member 91 to allow/prevent the flow of liquid glue through nozzle 70.

[0077] According to an embodiment, the actuation means 275 associated with said further dragging mechanism 140 comprise a mechanical motion transmission 149 to transmit the motion from the first motor 75 associated with the first dragging mechanism 40 to the at least one further dragging mechanism 140.

[0078] According to an embodiment, the mechanical transmission 149 is interposed between the first dragging mechanism 40 and the at least a one further dragging mechanism 140. Thereby, the mechanical transmission 149 transmits the motion from the first dragging mechanism 40 to the further dragging mechanism 140.

[0079] According to an embodiment, if the dispenser device comprises a single further wire feeding unit 200 in addition to the first wire feeding unit 100, the first dragging mechanism 40 and the further dragging mechanism 140 are substantially equal and mounted facing each other.

[0080] In this case, the further dragging mechanism 140 may comprise a driving roller 143 arranged coaxial to the driving roller 43 of the first dragging mechanism 40, and the mechanical transmission of motion 149 may comprise a mechanical fitting, such as a shaft-hub coupling, or a flanged joint.

[0081] The use of a single motor 75 for actuating all the dragging devices 40, 140 has the advantage of limiting the driving power required compared to the use of more than one motor. In fact, since the dispenser device is adapted to receive more than one hot melt glue wire simultaneously, at the same feeding rate and diameters of the wires, the hourly flow rate of molten glue increases as a multiple of the flow rate achieved with single wire. Therefore, a flow rate which is still high while reducing the rotation speed of the motor may be achieved, thus limiting the power consumption. Also, by reducing the feeding speed of the wires, the concurrent melting of the wires in the melter body reduces the mechanical resistance to the feeding of the wires and thereby the mechanical resistance on the motor shaft.

[0082] According to an embodiment, the actuation means 275 comprise a further motor 175 associated with a respective further dragging mechanism 140.

[0083] Thereby, each dragging mechanism 40, 140 can be actuated independently of the others, such as by adjusting the wire feeding rate differently or selectively.

[0084] This aspect is highly advantageous, mainly for the following two reasons.

[0085] A first advantage is the fact that the possibility of independently adjusting the wire feeding rate of the dragging mechanisms powers allows hot melt glue wires having different physical features to be fed simultaneously and melted with the same melter body of the same dispenser device.

[0086] If the melter body 20 has a separate outlet for each wire feeding unit 100, 200, it allows different types of molten glue adapted to different glueing processes to be dispensed simultaneously.

[0087] In the specific case in which the melter body 20 has a single melter body outlet 23, the first solid glue wire 30 and the at least one further solid glue wire 130 are hot-mixed during the crossing of the melter body, forming a molten glue which is the mixture of the hot melt glue of the first solid glue wire 30 and of the at least a second solid glue wire 130. This allows the extraordinary result of dispensing a molten glue with physical features modulated on the basis of different types of incoming glue wires, and of different feeding rates of the single wires, to be achieved.

[0088] If the device comprises a melter body temperature sensor, the above mixing may be made at a controlled temperature.

[0089] In the case of a melter body 20 having a single melter body outlet 23, instead of at least one further incoming solid glue wire 130, a wire of a hot melt chemical

additive may be provided, to be molten and mixed with the other glue wires in its passage within the melter body 20.

[0090] According to an embodiment, the dispenser device 1 comprises an electrical connector for electrically connecting the dispenser device 1 to an external power source and/or to an external control unit, to electrically power and/or control at least one of the following devices:

- said first motor 75;
- said at least one further motor 175;
- said heating members of said melter body;
- said temperature sensor;
- said controlled actuation means of said at least one valve 90.

[0091] According to an embodiment, the first motor 75 comprises means to adjust the rotation speed of the motor itself, such as an electronic inverter.

[0092] According to an embodiment, the dispenser device 1 comprises a control unit functionally connected to said means to adjust the rotation speed of motor 75 and to said temperature sensor 73, said control unit being configured to adjust the feeding speed of the solid glue wire 30 according to the temperature of the melter body. Thereby, an optimal dispensing of molten glue can be obtained.

[0093] According to an embodiment, the control unit is mounted on board of said dispenser device.

[0094] Alternatively, the control unit is implemented on an external machine to which the dispenser device is mounted. In this case, the dispenser device comprises one or more connectors to interface with such an external machine.

[0095] According to an embodiment, the dispenser device 1 comprises a first connection bracket 10 to connect the first dragging mechanism 40 and the melter body 20 configured so that the outlet 42 of the first dragging mechanism 40 faces and in particular is aligned to the first melter body inlet 21.

[0096] According to an embodiment, the dispenser device 1 comprises at least one further connection bracket 110 to connect the at least one further dragging mechanism 140 and the melter body 20.

[0097] According to an embodiment, the first connection bracket and/or the second connection bracket are flat metal plates.

[0098] In other words, the dragging mechanism 40 and the melter body 20 are rigidly connected together through the first connection bracket 10.

[0099] The first connection bracket 10 supports the first dragging mechanism 40 and the melter body 20 at a predetermined distance between them, for example in the range from 20 mm to 300 mm, in particular in the range from 30 mm to 150 mm, in particular substantially equal to 80 mm. It was found that such distances prevent such an amount of heat from being transmitted, between the melter body 20 and the first dragging mechanism 40, to soften or melt the solid glue wire 30 before it reaches the melter body 20.

[0100] According to an embodiment, the dispenser device 1 comprises a mounting portion 11 to secure said dispenser device 1 to a structure of an automatic glueing system.

[0101] According to an embodiment, said first connection bracket 10 comprises said mounting portion 11.

[0102] According to an embodiment, said mounting portion 11 comprises at least one through hole 12, for example to receive a pin or a screw.

[0103] According to an embodiment, the first wire feeding unit 100 comprises a first reel-holder device 83 adapted to accommodate a coil of said first solid glue wire 30.

[0104] According to an embodiment, the at least one further wire feeding unit 200 comprises a further reel-holder device 183 adapted to accommodate a coil of said at least one further solid glue wire 130.

[0105] According to an embodiment, said first reel-holder device 83 is secured to said first wire feeding unit 100 through a rigid arm 84.

[0106] According to an embodiment, said further reel-holder device 183 is secured to said first wire feeding unit 100 through said rigid arm 84.

[0107] According to an embodiment, said first reel-holder device 83 and said at least one further reel-holder device 183 are rotatably supported by a rigid arm 84 secured to said first connection bracket 10.

[0108] These provisions allow the dispenser device 1 to be implemented as a single self-contained block, which is structurally compact and solid, easily mountable to the structure of a glueing system and simultaneously easily removable, for example to reconfigure the glueing system for a new process.

[0109] In other words, such a dispenser device may be seen as a glueing module for an automatic glueing system.

[0110] According to an embodiment, said at least one further wire feeding unit 140 is a single further wire feeding unit 140, in which said at least one further melter body inlet 142 is a single further melter body inlet 142, in which said at least one melter body outlet 23 is a single melter body outlet 23, and in which said opening/closure valve 90 is a single opening/closure valve 90.

[0111] In this case, the first dragging mechanism 40 is arranged facing said single further dragging mechanism 40, for example by being kinematically mutually engaged.

[0112] An automatic glueing system 300 according to an embodiment of the invention to apply molten hot melt glue to a piece to be glued 313 is described herein, comprising:

- at least one dispenser device 1 as described above;
- a piece holder 317 to support the piece to be glued 313;
- moving means 307 to obtain a movement between said piece to be glued 313 and said at least one dispenser device 1;

- a support structure 303 to support said at least one dispenser device 1;
- a connecting device 304 for removably securing said at least one dispenser device 1 to said support structure 303;
- a control unit 318 to drive said at least one dispenser device 1.

[0113] According to an embodiment, the control unit 318 is configured to drive said first motor 75, or said first motor 75 and said at least one further motor, said heating members and said at least one opening/closure valve 90.

[0114] According to an embodiment, the automatic glueing system 300 comprises a connector, for example secured to said support structure 303, for example of electrical type, adapted to be removably connected to a corresponding connector secured to said at least one dispenser device 1.

[0115] For example, the automatic glueing system is a system for producing a filter 313, for example for filtering a fluid flow when such a fluid passes therethrough. For example, the automatic glueing system 300 comprises a pleating machine 319.

[0116] One end of a filtering media tape 330 is dragged on a piece holder 317 along a feeding direction 316, while a motorized marker roller 320 provides a folding line on the filtering media transversely to the feeding direction of the filtering media 316.

[0117] A dragging roller 321 may be provided downstream of the motorized marker roller 320.

[0118] A pair of fold forming screws 323 may be provided downstream of the motorized marker roller 320, adapted to provide the folding itself in order to obtain the pleated filter media 213.

[0119] According to an embodiment, the at least one dispenser device 1 is mounted downstream of the forming screws 323, for example to arrange molten glue on the ridges of the pleated media 213 in the feeding direction 316 of the pleated media 313.

[0120] In the example in figures 10 to 12, the automatic glueing system 300 comprises two dispenser devices 1, for example they are slidably constrained to the system in a direction transverse to the feeding direction 316 of the pleated media.

[0121] The dispenser device 1 according to the present invention may be mounted to any support structure, for example made of modular components assembled together to form any desired configuration.

[0122] The dispenser device 1, as an alternative to the use to stabilize the ridges of filtering media, may be used for many other applications, such as paper glueing, for example by locating the glue distribution at the edges to be glued.

[0123] Those skilled in the art may make several changes, adjustments, adaptations and replacements of elements with others which are functionally equivalent to the embodiments of the above-described device, in order to meet incidental needs, without departing from the scope of the following claims. Each of the features described as belonging to a possible embodiment can be obtained independently of the other embodiments described.

Claims

1. A dispenser device (1) for melting hot melt solid glue as a wire (30, 130) and for dispensing molten glue starting from said hot melt solid glue as a wire, comprising:

A) a first wire feeding unit (100) comprising:

- a first dragging mechanism (40) comprising an inner passage (47, 48) having an inlet (41) and an outlet (42) for a first solid glue wire (30), dragging members (43,44) arranged to drag said first solid glue wire (30) from said inlet (41) to said outlet (42) through said inner passage (47,48) applying to said first solid glue wire (30) a dragging force;
- a first motor (75) associated with said first dragging mechanism (40) to actuate said dragging members (43, 44) of said first dragging mechanism (40);
- a first connection member (60) having a tubular shape defining an inner passage (66) for said first solid glue wire (30) and having a first end (61) connected to said outlet (42) of said first dragging mechanism (40) and a second end (62) opposite said first end (61), said inner passage (66) of first tubular member being aligned with said inner passage (47, 48) of first dragging mechanism, said first connection member (60) being made of a thermally insulating material;

B) at least one further wire feeding unit (200) comprising:

- a further dragging mechanism (140) comprising an inner passage (147, 148) having an inlet (141) and an outlet (142) for a further solid glue wire (130), dragging members (143, 144) arranged to drag said further solid glue wire (130) from said inlet (141) to said outlet (142) through said inner passage (147, 148), applying to said further solid glue wire (130) a dragging force;
- actuation means (275) associated to said further dragging mechanism (140) to actuate said dragging members (143, 144) of said further dragging mechanism (140);
- a further connection member (160) of a

tubular shape defining an inner passage (166) for said further solid glue wire (130) and having a first end (161) connected to said outlet (142) of said further dragging mechanism (140) and a second end (162) opposite said first end (161), said inner passage (166) of further connection member (160) being aligned with said inner passage (147, 148) of said further dragging mechanism (140), said further connection member (160) being made of a thermally insulating material;

C) a melter body (20) having a first inlet (21) for said first solid glue wire (30) and at least one second inlet (121) for said at least one further solid glue wire (130), said first inlet (21) being connected to said second end (62) of said first connection member (30), and said at least one second inlet (121) being connected to said second end (162) of a corresponding second connection member (160), said melter body (20) having at least one outlet of melter body (23) for molten glue, a first inner passage (22) connecting said first melter body inlet (21) with said at least one melter body outlet (23), at least one further inner passage (122) connecting said at least one further melter body inlet (121) with said at least one melter body outlet (23); said melter body (20) comprising heating members to melt the first solid glue wire (30) and the at least one further solid glue wire (130) along said first melter body inner passage (22) and said at least one further melter body passage (122);

D)at least one dispensing nozzle (70) for molten glue associated with said at least one melter body outlet (23) ;

E) at least one opening/closure valve (90) comprising an occlusion member (91) movable between a first position in which the occlusion member (91) allows the flow of the molten glue through said at least one melter body outlet (23), and a second position in which the occlusion member (91) prevents the flow of molten glue through said at least one melter body outlet (23), driven actuation means (92) to actuate said valve.

2. The dispenser device (1) according to claim 1, wherein the inner passage (47, 48) of the first dragging mechanism (40) and the inner passage (66) of the first connection member (60) form a continuous conduit extending along a first substantially straight extension line (L) and/or in which the inner passage (147, 148) of the at least one further dragging mechanism (140) and the inner passage (166) of the at least one further connection member (160) form a corresponding continuous conduit extending along at least one further substantially straight extension line (L').

3. The dispenser device (1) according to claim 1 or 2, wherein said first extension line (L) and said at least one further extension line (L') are substantially mutually parallel.

4. The dispenser device (1) according to one or more preceding claims, wherein the melter body (20) has a main extension direction (R) substantially parallel to the first extension line (L), said melter body (20) defining a rear end face (27) transversal to said first extension line (L) and comprising said first melter body inlet (21) and said at least one further melter body inlet (121), and a front end face (28) opposite said rear end face (27) comprising said at least one melter body outlet (23).

5. The dispenser device (1) according to claim 4, wherein said at least one opening/closure valve (90) is a pin valve mounted to the melter body (20), in which the movable occlusion member (91) is a pin member extending along a substantially straight pin line (S), in which said first melter body inner passage (22), and/or said at least one further melter body inner passage (122), extend along corresponding melter body passage lines (C, C') and in which said pin line (S) is oblique with respect to said melter body passage lines (C, C') and incident to said melter body passage lines (C, C'), for example at said at least one melter body outlet (23).

6. The dispenser device (1) according to claim 5, wherein the melter body (20) comprises at least one inner through hole (97) extending along said pin line (S), said at least one through hole (97) slidably receiving therein said pin member (91), said at least one through hole (97) having a first end (98) to which said pin valve (90) is secured, and an opposite end (99) to which said nozzle (70) is secured.

7. The dispenser device (1) according to one or more preceding claims, wherein said actuation means (275) associated to said further dragging mechanism (140) comprise:

- a mechanical motion transmission (149) to transmit the motion from the first motor (75) associated with the first dragging mechanism (40) to the at least one further dragging mechanism (140); or
- a further motor (175) associated with a corresponding further dragging mechanism (140).

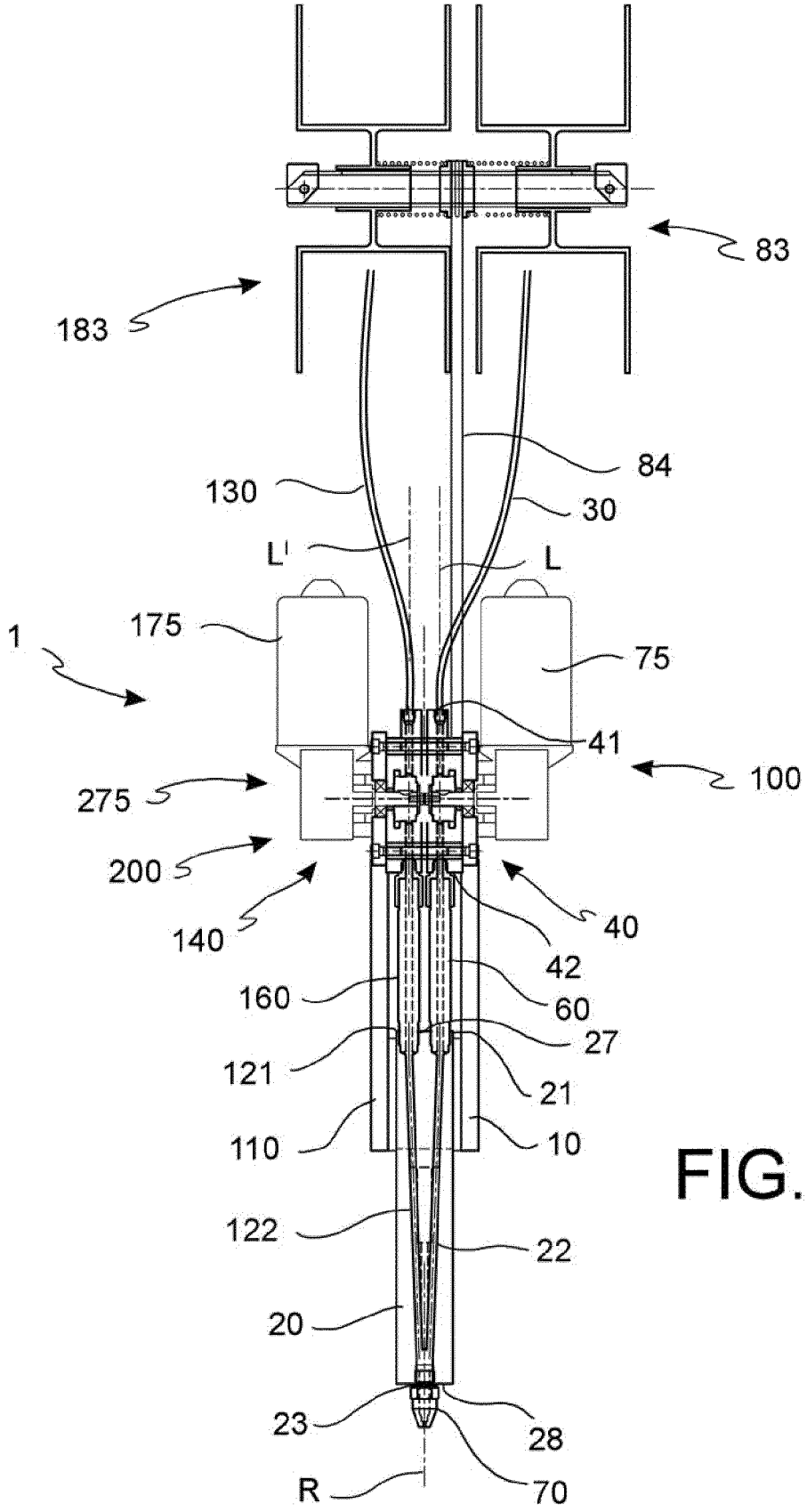
8. The dispenser device (1), according to one or more preceding claims, comprising a first connection bracket (10) to connect the first dragging mechanism

(40) and the melter body (20) so that the outlet (42) of the first dragging mechanism (40) faces and is aligned to the first melter body inlet (21), and/or comprising a mounting portion (11) to secure said dispenser device (1) to a structure of an automatic glueing system.

9. The dispenser device (1) according to least one preceding claim, wherein said at least one further wire feeding unit (140) is a single further wire feeding unit (140), in which said at least one further melter body inlet (142) is a single further melter body inlet (142), wherein said at least one melter body outlet (23) is a single melter body outlet (23), and wherein said opening/closure valve (90) is a single opening/closure valve (90).

10. An automatic gluing system (300) for applying molten hot melt glue to a piece to be glued (313), comprising:

- at least one dispenser device (1) according to one or more preceding claims;
- a piece holder (317) for supporting the piece to be glued;
- moving means (307) for obtaining a movement between said piece to be glued and said at least one dispenser device (1)
- a support structure (303) for supporting said at least one dispenser device (1);
- a connecting device (304) for removably securing said at least one dispenser device (1) to said support structure (303);
- a control unit (318) for driving and controlling said at least one dispenser device (1).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84
130
30
L'
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175
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75
41
100
275
200
140
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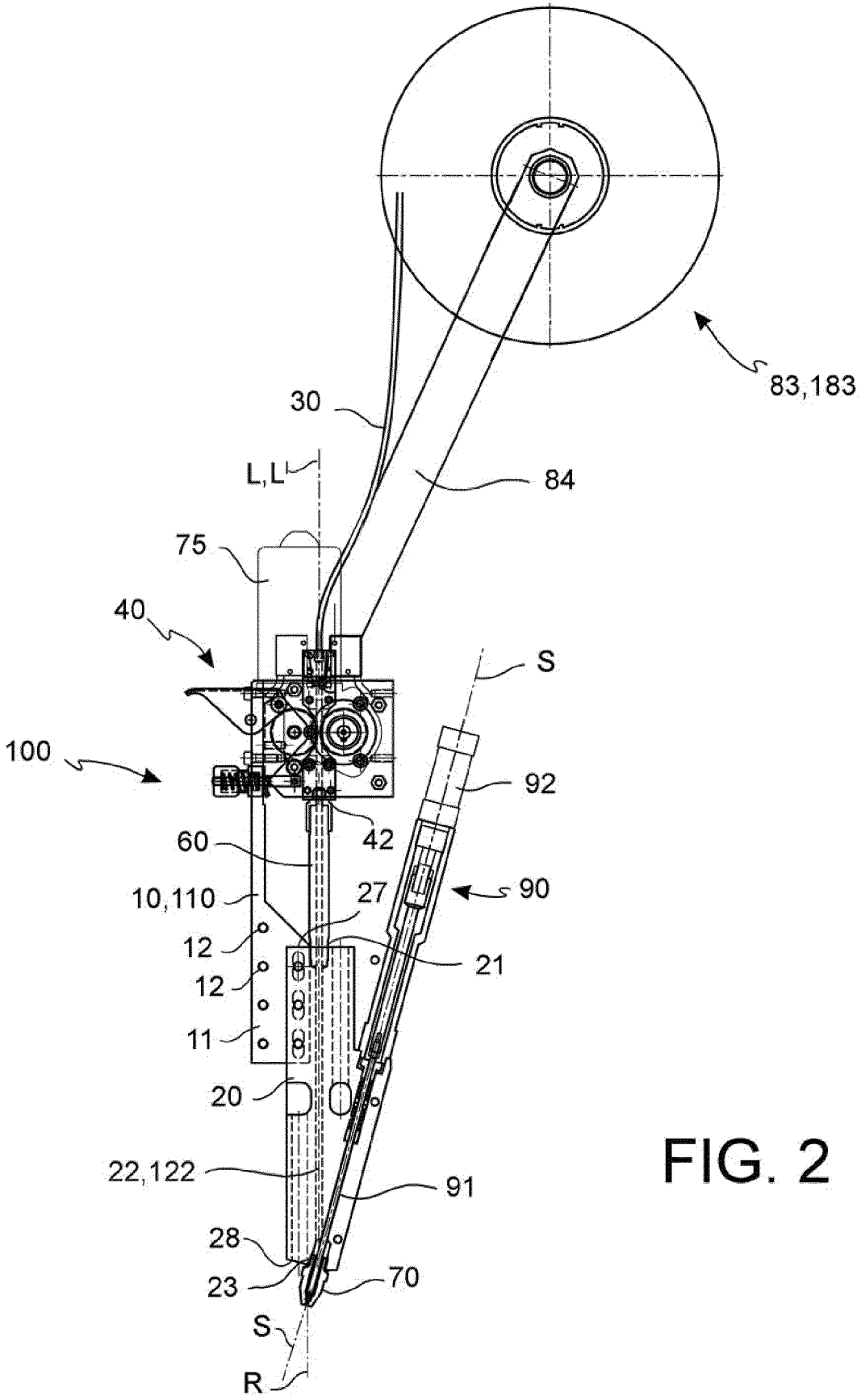
60
27
121
21
110
10
122
22
20
23
28
R
70

FIG. 1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S
R

FIG. 2

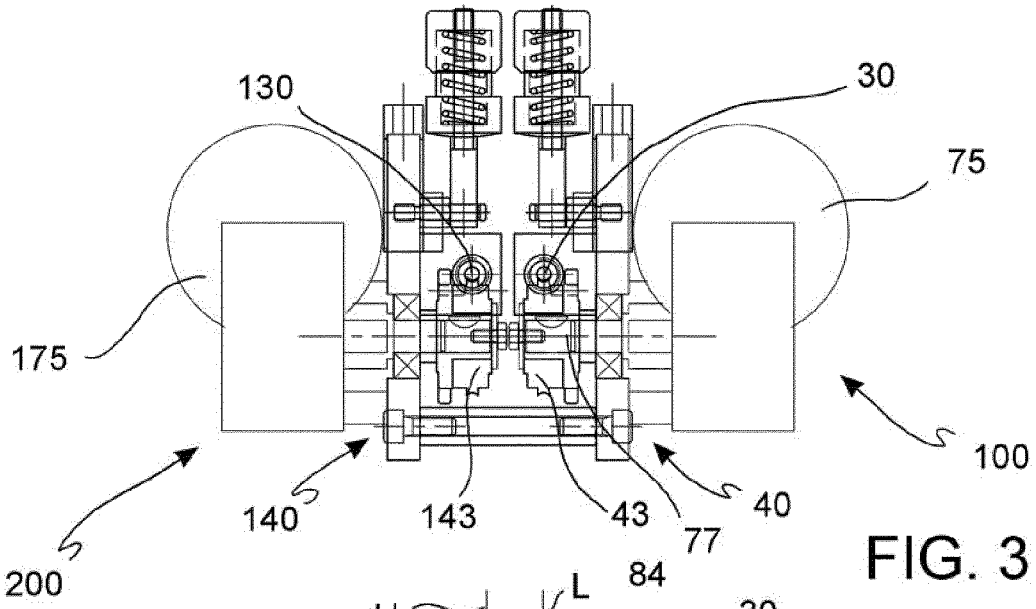
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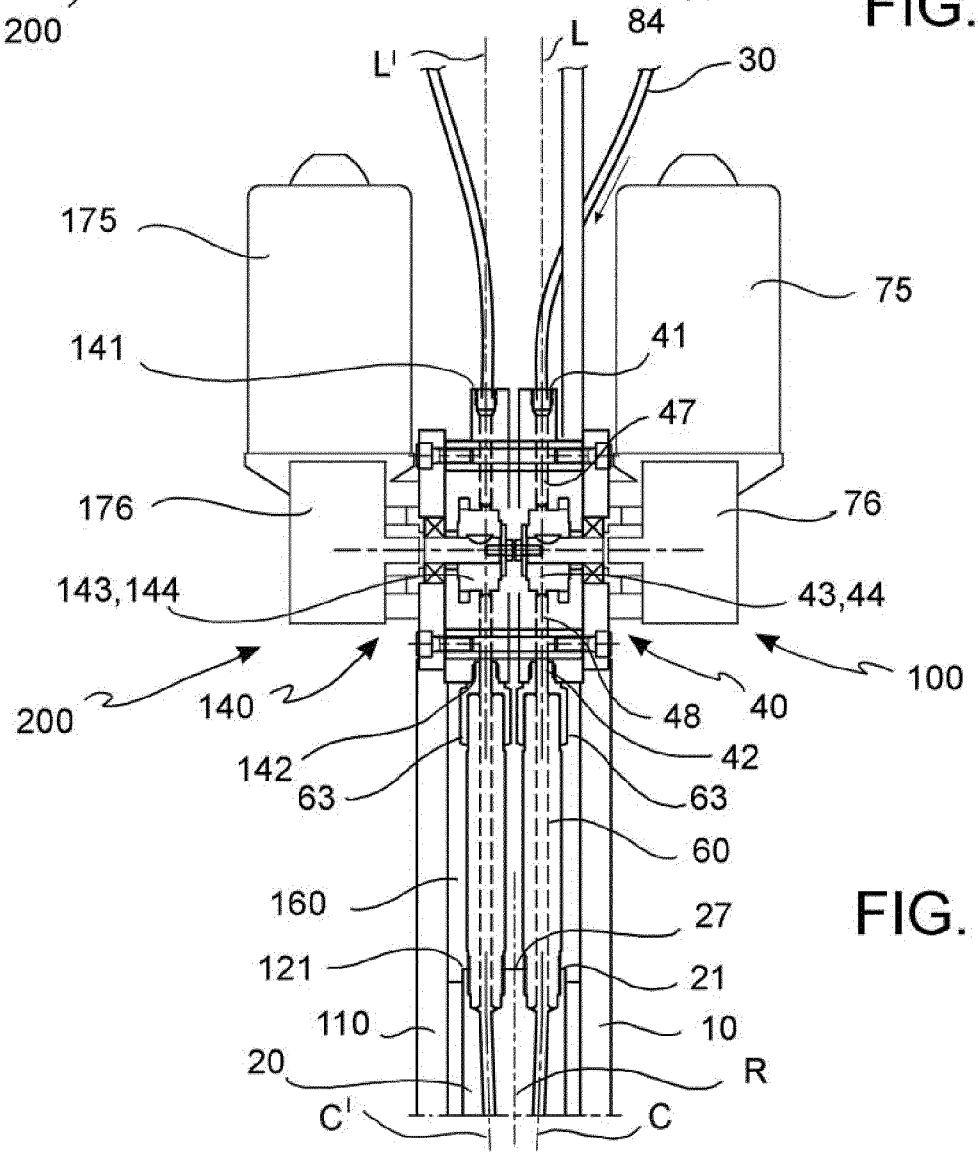
FIG. 3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L
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175
75
141
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100
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48
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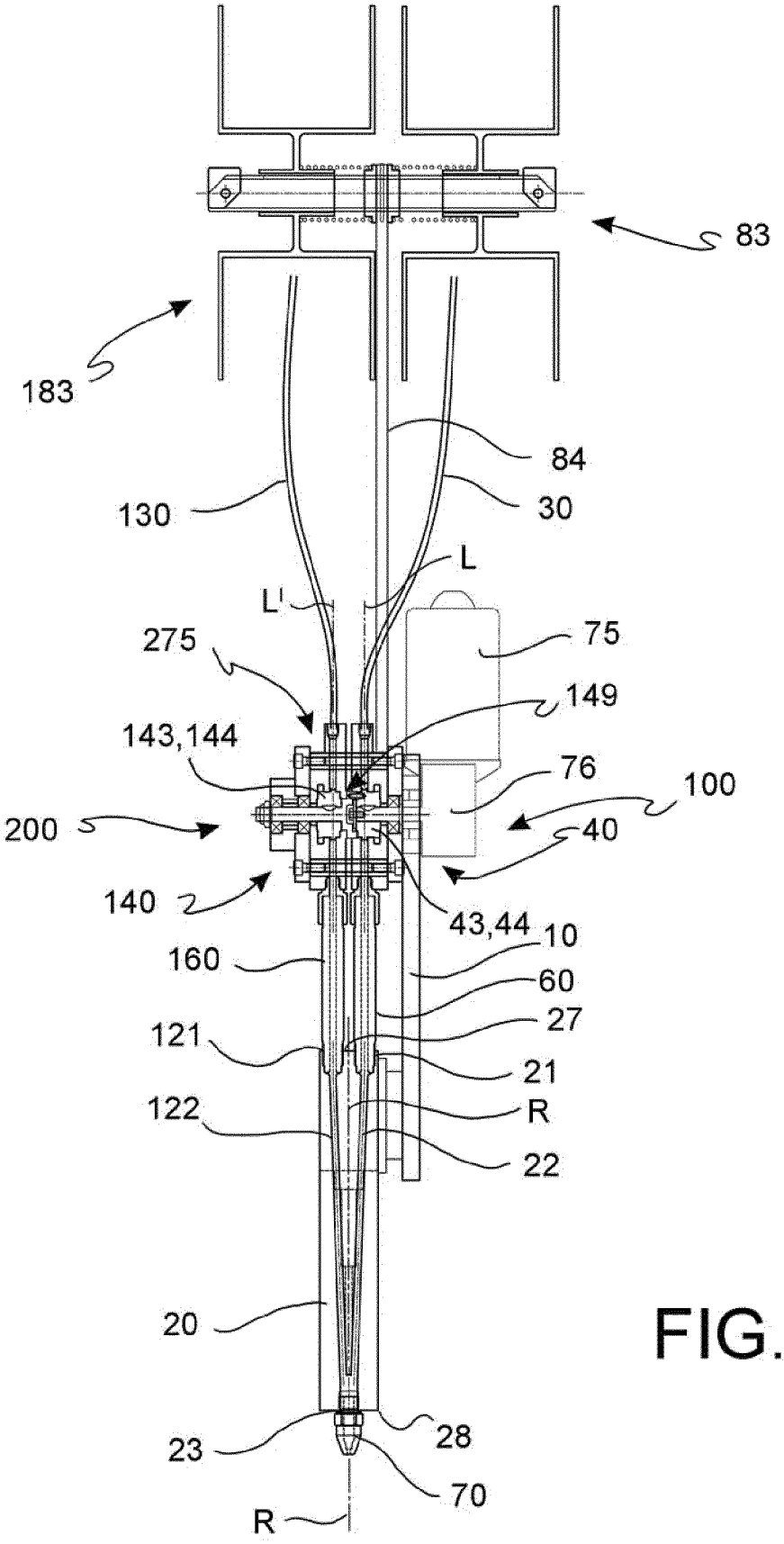
42
63
63
60
160
27
121
21
110
10
20
R
C'
C

FIG. 4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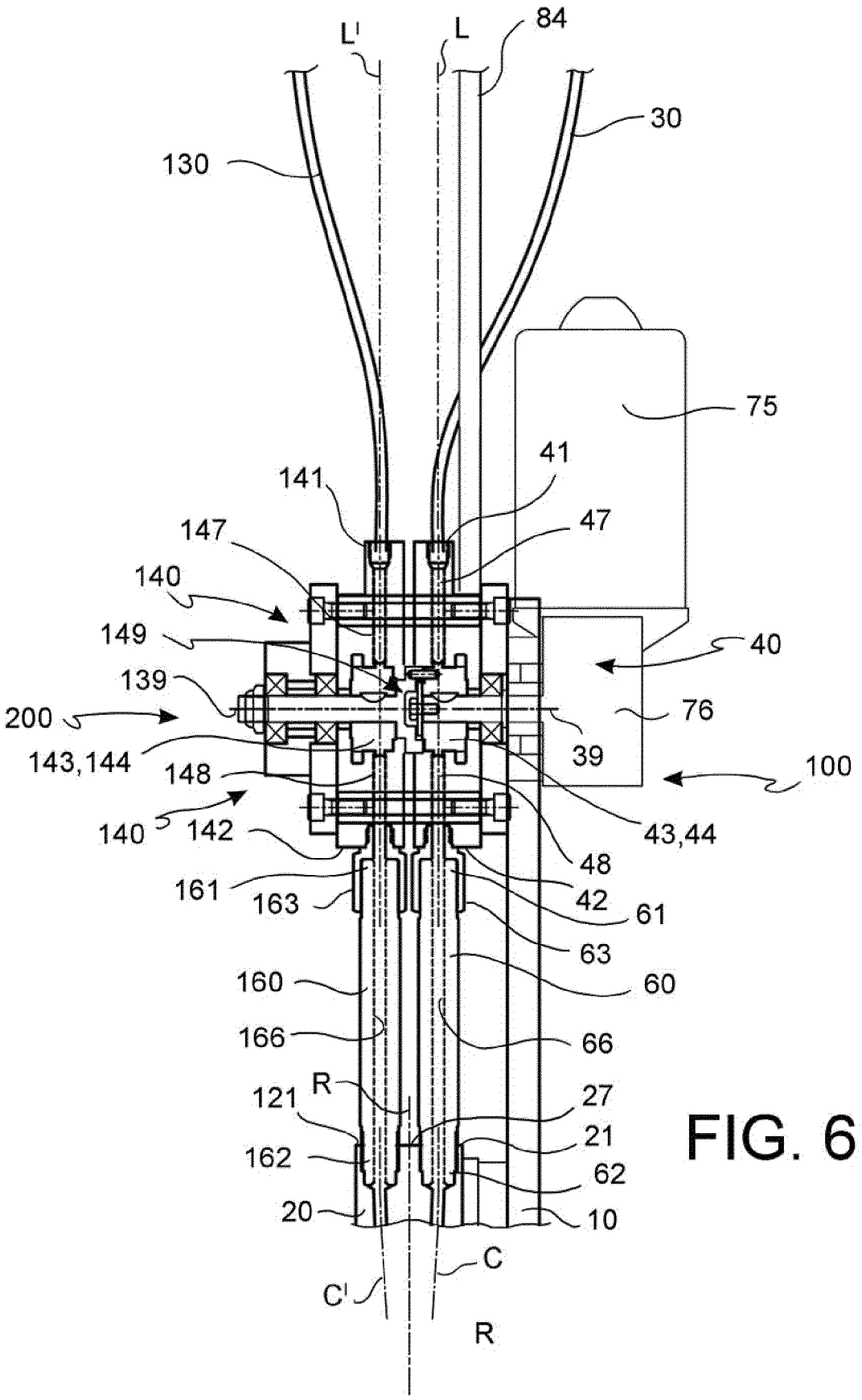
27
121
21
122
R
22
20
28
23
70
R

FIG. 5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L
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30
130
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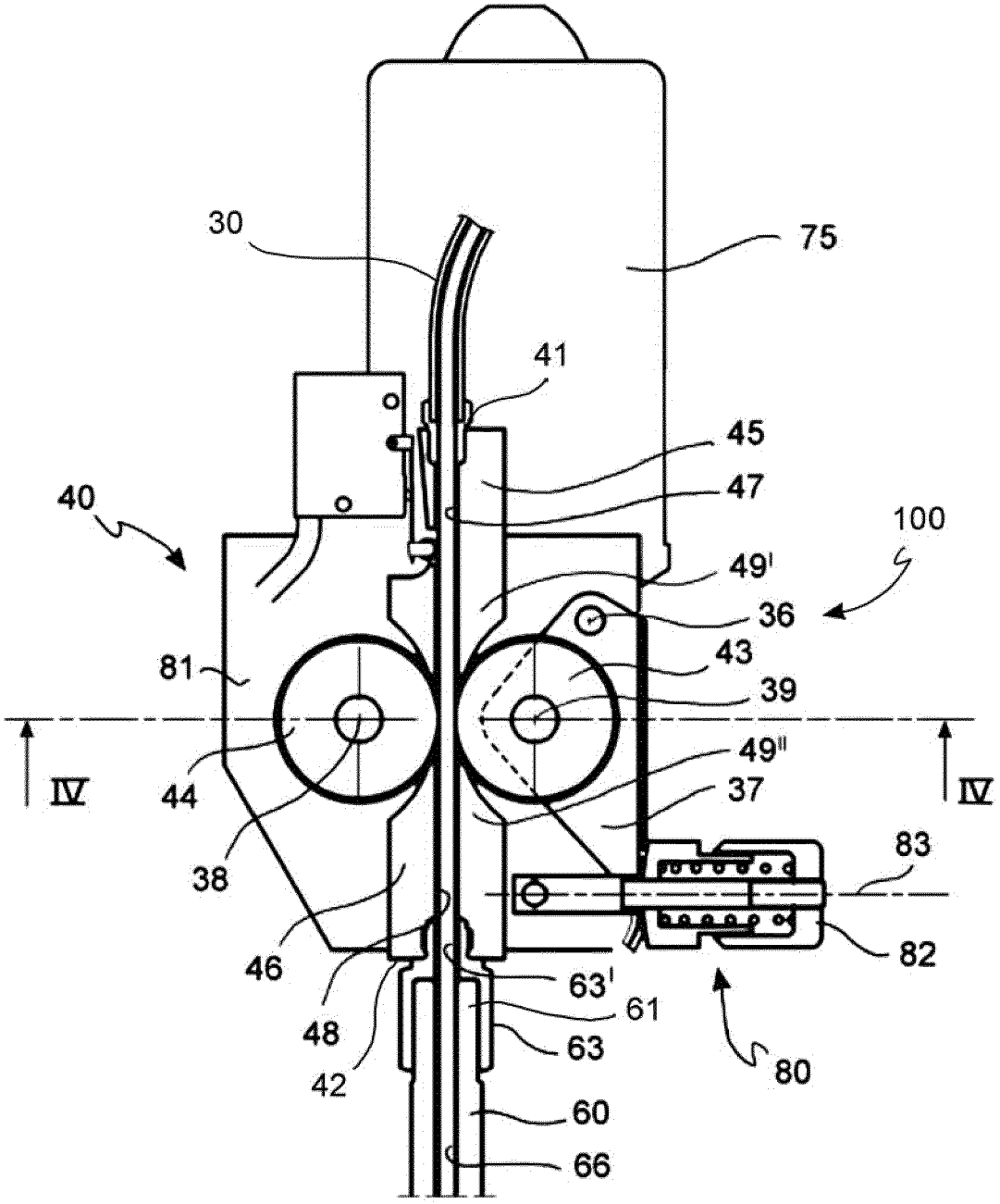
140
142
43,44
48
161
42
163
61
63
160
60
166
66
R
121
27
21
162
62
20
10
C
C'
R

FIG. 6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75
41
45
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40
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49'
36
43
81
39
49"
IV
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44
37
83
38
82
46
63'
61
48
63
80
42
60
66

FIG. 7

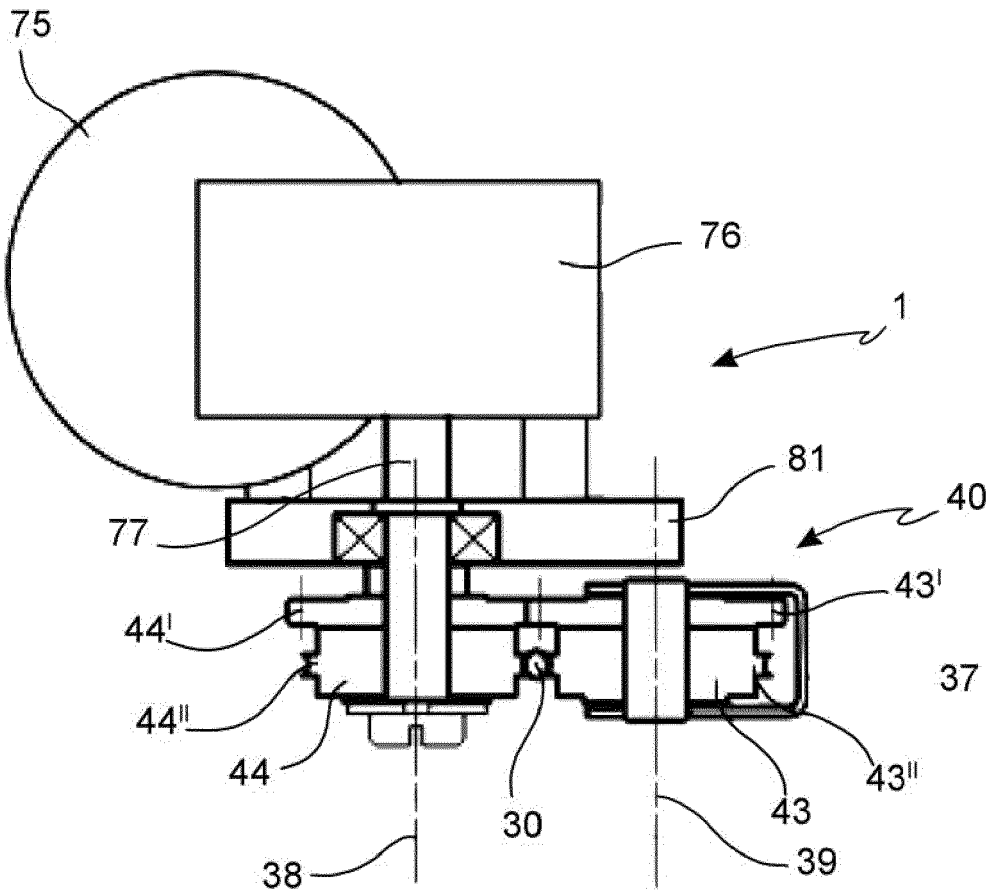

FIG. 7A

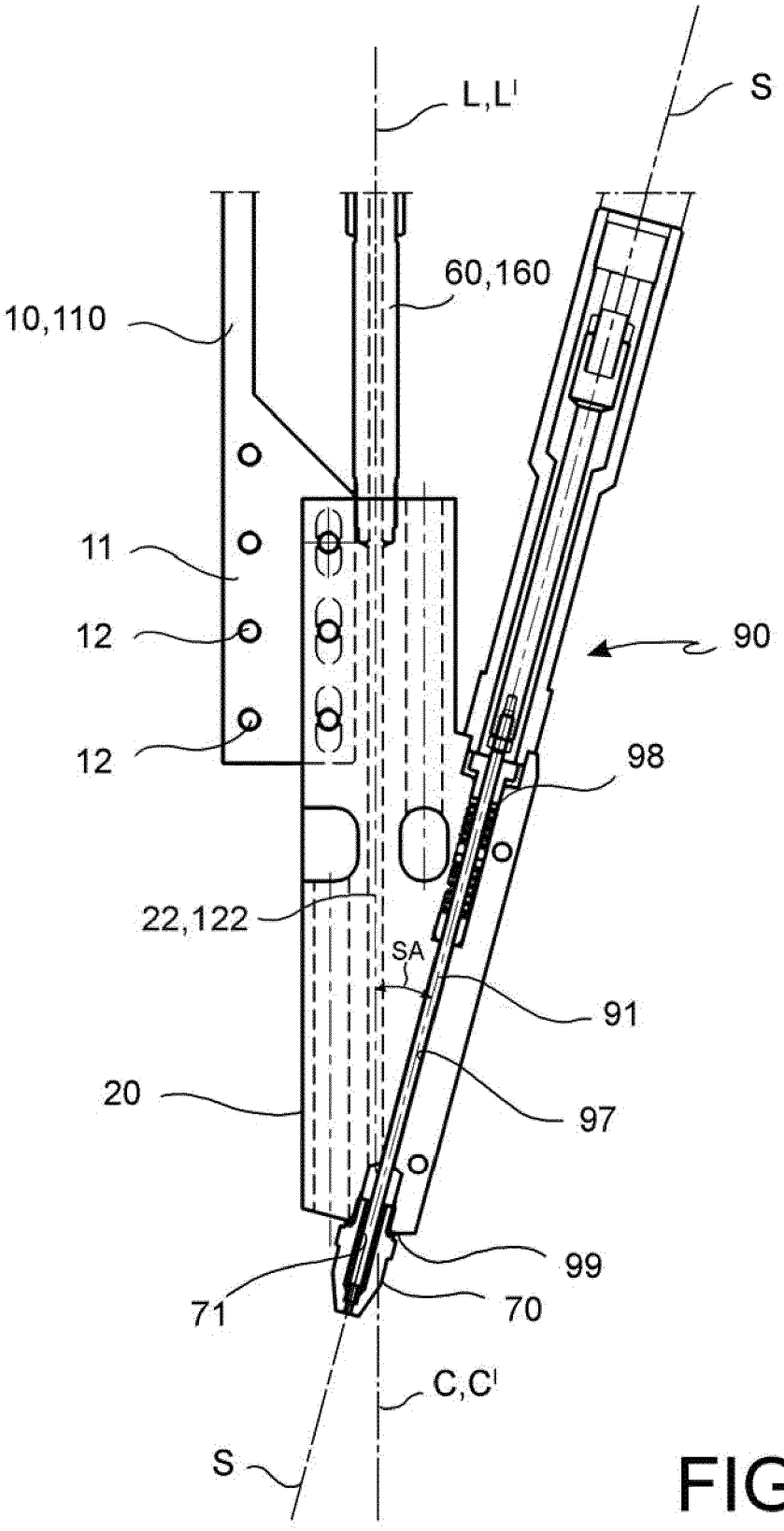

FIG. 8

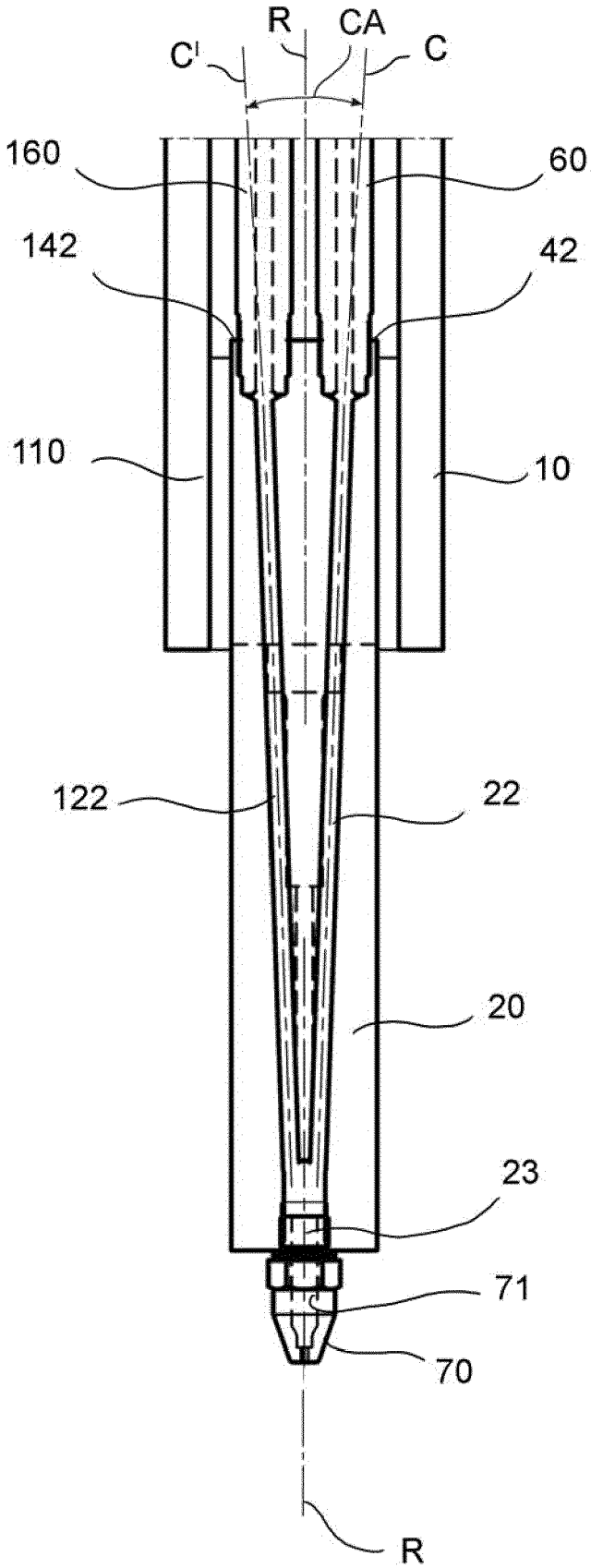

FIG. 9

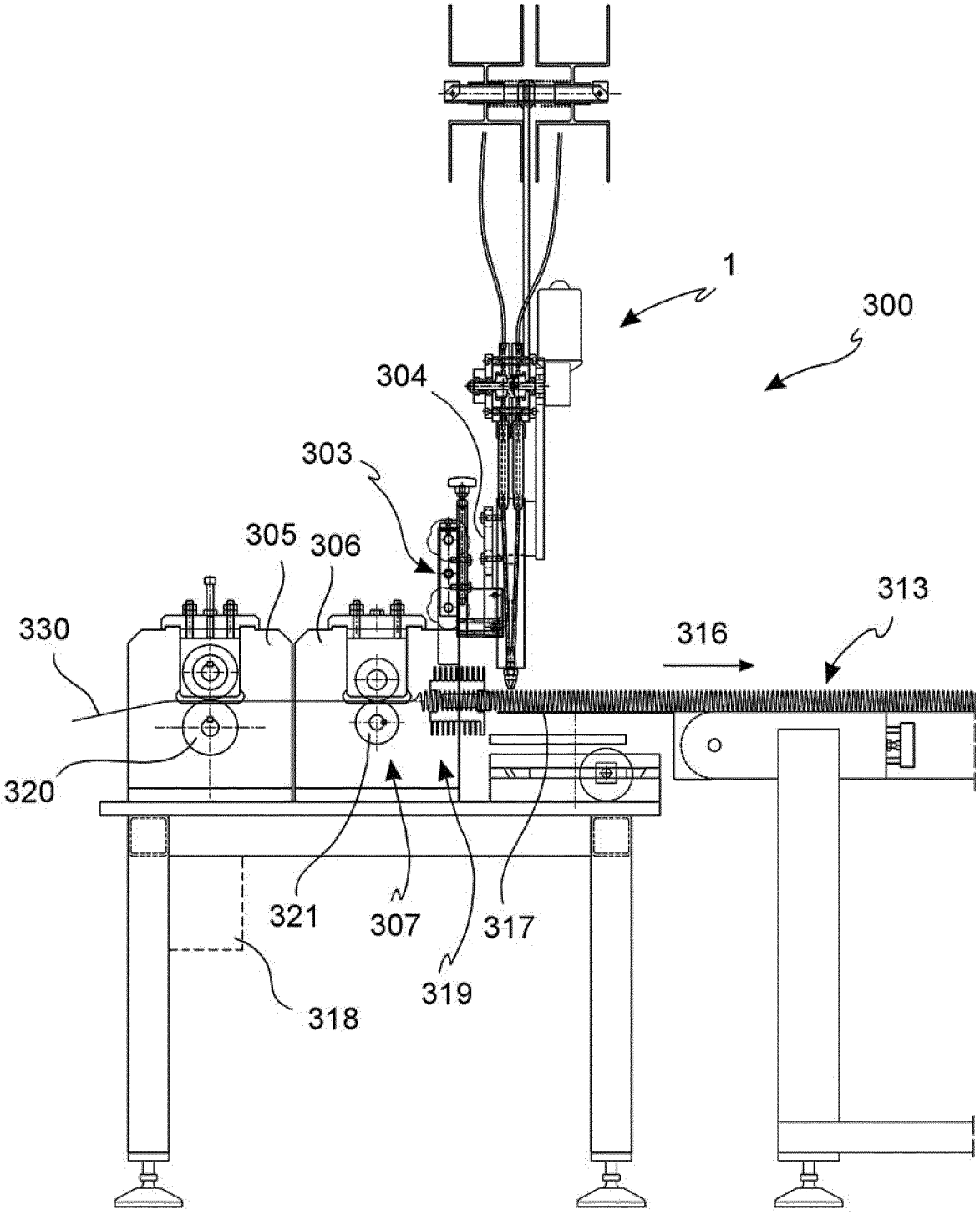

FIG. 10

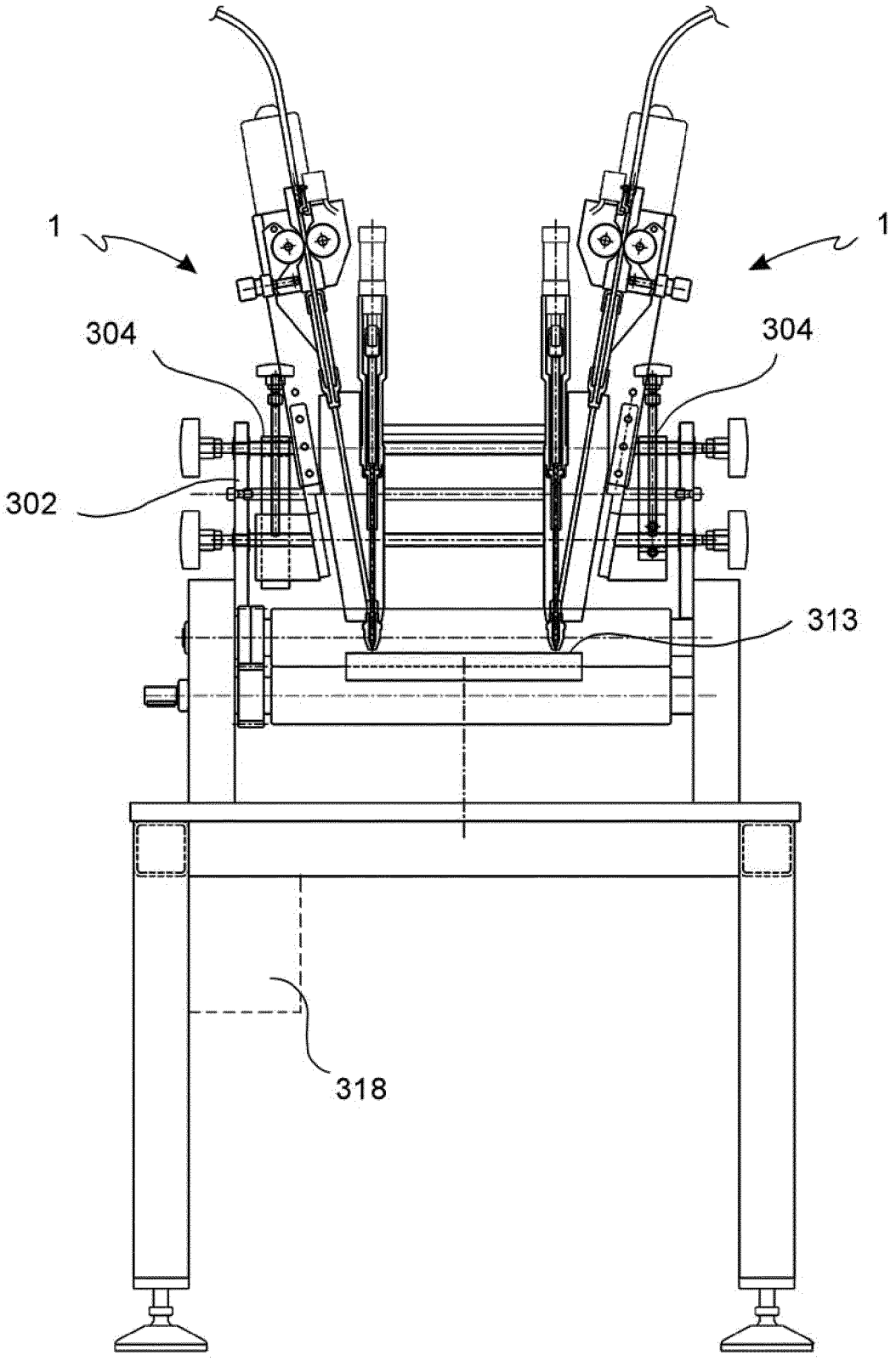

FIG. 11

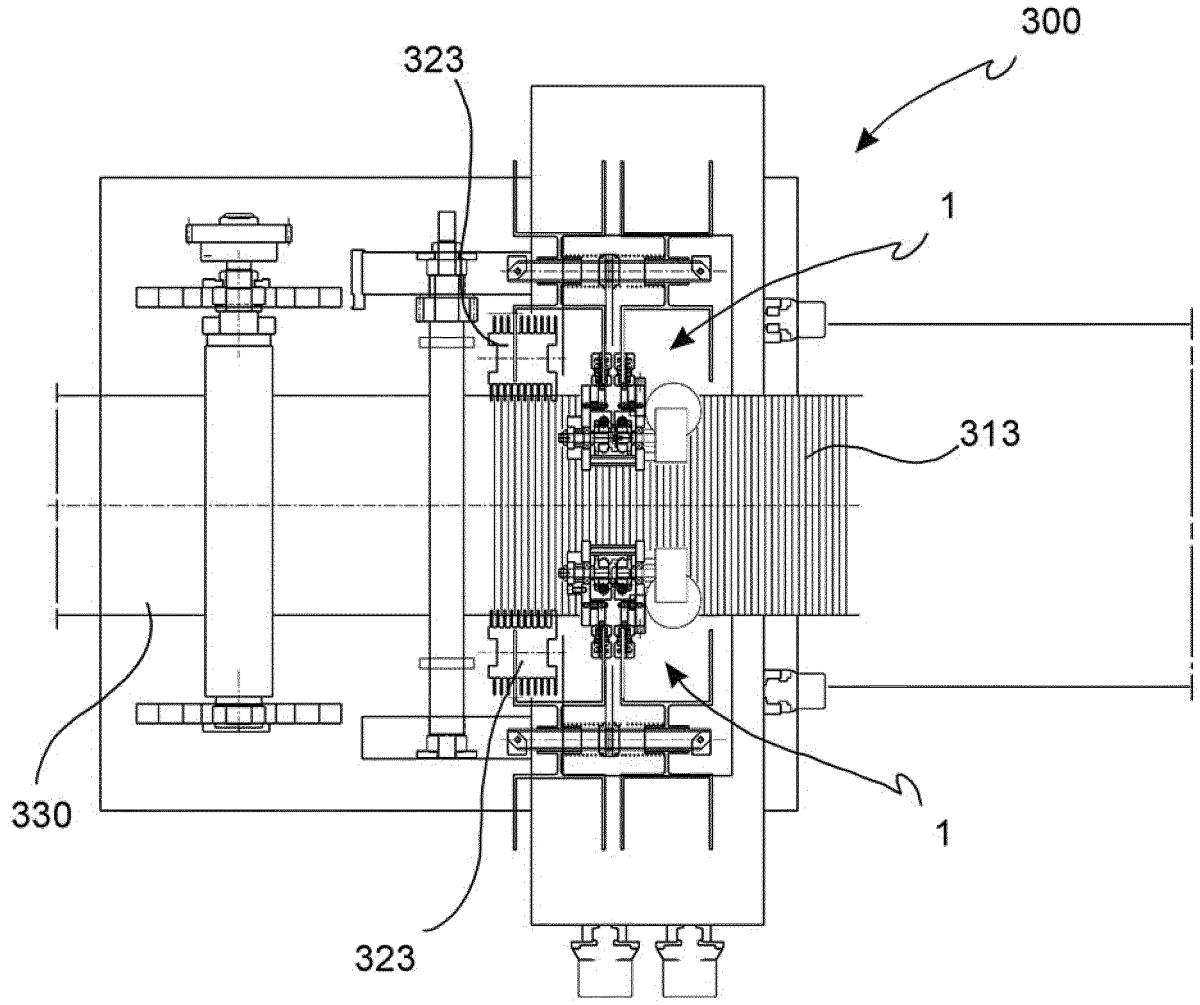

FIG. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 3185

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 4 804 110 A (SPERRY CHARLES R [US] ET AL) 14 February 1989 (1989-02-14) * column 5, lines 1-33 * * column 10, lines 15-26; figures 1,11 * -----	1,10	INV. B05C5/04 B05C5/00 ADD. B05C17/005
A	US 4 613 062 A (WALTER JOHN [US] ET AL) 23 September 1986 (1986-09-23) * abstract; figures * -----	1	
A	US 5 791 560 A (ROGERS ALAN R [US] ET AL) 11 August 1998 (1998-08-11) * abstract; figures * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)
B05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	1 July 2016	Brévier, François

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01-07-2016

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US 4613062 A	23-09-1986	EP 0207200 A1	07-01-1987
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		US 5791560 A	11-08-1998

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82