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(54) **TAPING UNIT FOR WETTING GUMMED PAPER TAPE**

(57) Taping unit for wetting gummed paper tapes (12) for automatic package sealing machines having a body (15) comprising: a feeding assembly (16) for feeding the tape (12); a cutting assembly (17) for cutting the tape (12); a wetting assembly (18) for wetting the tape (12); a first articulated roller (50); a second articulated roller (60); characterized in that said feeding assembly (16), said cutting assembly (17) and said wetting assembly (18) are combined in one body and arranged so that said tape

(12) moves vertically within said body (15); said body (15) comprises a vertical opening for inserting the tape from said opening, perpendicular to the path thereof; said first articulated roller (50) and said second articulated roller (60) are driven by a first actuator (54) and by a second actuator (68); said first actuator (54) and said second actuator (68) are fixed on said body (15) by means of a pin (55, 56) each positioned on the same axis. (Fig. 3)

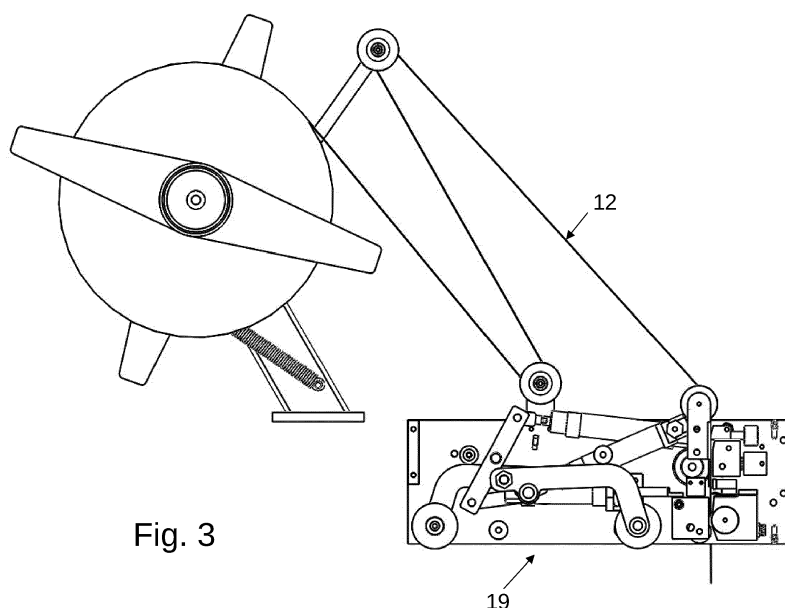


Fig. 3

Description

[0001] The present invention refers to a taping unit for wetting gummed paper tape, for automatic package sealing machines.

[0002] Sealing machines are known that apply adhesive sealing tapes along the top and bottom of cardboard boxes, once their closing flaps have been folded.

[0003] For said purpose they use automatic taping units positioned along the feed path of the boxes on a supporting surface.

[0004] The conventional taping units provide an adhesive plastic tape which comes from reels and is made to adhere, by means of articulated rollers, to the upper and lower sides of the package to be sealed.

[0005] The taping units include two application rollers one being positioned at the inlet and the other at the outlet of the taping unit and elastically strained to protrude and retract during the passage of the boxes.

[0006] A movable cutting blade is also provided between the two rollers to cut the tape when required.

[0007] Automatic taping units that provide a gummed paper tape and therefore comprise devices that wet the gummed side of the gummed paper tape also exist.

[0008] In both cases, due to their movement, the application rollers require a large space.

[0009] Due to the various passages of the gummed paper tape inside the taping unit, the insertion of said gummed paper tape is problematic in the case of loading of a new tape or removal due to jamming.

[0010] Furthermore, the movable cutting blade is dangerous for the user due to its movements.

[0011] The object of the present invention is to provide a taping unit for wetting gummed paper tape that has dimensions smaller than those of the known art.

[0012] Another object is to provide a taping unit that allows simplification of the procedure for loading a new gummed paper tape and management of the operating phases by the machine operator.

[0013] A further object is to provide a taping unit that is safer for the user.

[0014] Another object is to provide a taping unit that allows interchangeability with taping units already in use that operate with adhesive plastic tape.

[0015] A further object is to provide a taping unit that allows routine maintenance to be reduced.

[0016] In accordance with the present invention, said objects and others still are achieved by a taping unit for wetting gummed paper tapes for automatic package sealing machines having a body comprising: a tape feeding assembly; a tape cutting assembly; a tape wetting assembly; a first articulated roller; a second articulated roller; characterized in that said feeding assembly, said cutting assembly and said wetting assembly are combined in one body and arranged so that said tape moves vertically inside said body; said body comprises a vertical opening for inserting the tape, from said opening, perpendicular to the path thereof; said first articulated roller

and said second articulated roller are driven by a first actuator and by a second actuator; said first actuator and said second actuator are fixed on said body, by means of a pin each, positioned on the same axis.

[0017] Further characteristics of the invention are described in the dependent claims.

[0018] This solution has various advantages compared to the solutions of the known art.

[0019] The present invention offers an incentive to the use of eco-compatible material, and therefore a saving on disposal, using tapes made of paper instead of plastic.

[0020] The solution found, due to its reduced overall dimensions, allows old units using adhesive plastic tape to be converted into gummed paper units.

[0021] The characteristics and advantages of the present invention will be evident from the following detailed description of a practical embodiment thereof, illustrated by way of non-limiting example in the attached drawings, in which:

figure 1 shows schematically a taping unit, with a flap closed, in accordance with the present invention; figure 2 shows schematically a taping unit, with a flap open, in accordance with the present invention; figure 3 shows schematically a taping unit, open and seen laterally, in accordance with the present invention;

figure 4 shows schematically the body of a taping unit, open and seen laterally, in accordance with the present invention;

figure 5 shows schematically the body of a taping unit, seen laterally from behind, in accordance with the present invention;

figure 6 shows schematically and partially the body of a taping unit, open and seen laterally from the front, in accordance with the present invention;

figure 7 shows schematically the body of a taping unit, open and seen laterally, with both the outer rollers, in accordance with the present invention;

figures 8-11 show schematically four different operating phases of a taping unit, open and seen in perspective, in accordance with the present invention.

[0022] Referring to the attached figures, a taping unit for wetting gummed paper tape, for automatic package sealing machines, in accordance with the present invention, comprises a reel holder 10 on which the reel 11 of the gummed paper tape 12 is placed. The tape 12 passes through a first roller 13 and a second tape relay and braking roller 14, and then enters, from above, the body 15 of the taping unit and, moving vertically, is fed out from below the body 15.

[0023] The body 15 consists of a box-type containment frame to which the structural parts of the taping unit are fixed.

[0024] Inside the body 15 is the tape feeding assembly 16, the cutting assembly 17 and the wetting assembly 18 grouped and arranged vertically so that the tape 12

moves vertically inside the body 15.

[0025] The body 15 further comprises, at the side of the preceding assemblies, the assembly of rollers 19 for laying and rolling the tape 12.

[0026] On the body 15, near the assemblies 16-18, a flap 20 is arranged which can be opened to facilitate the operator during positioning of the tape 12 inside the body 15.

[0027] The tape 12 at the inlet of the body 15 enters the tape feeding assembly 16, passing around a non-return roller 25 and rests on a vertical guide 26 opposite a tape non-return rocker stop 27 which pushes the tape 12 against the guide 26.

[0028] A tape feed roller 28 is found below the guide 26 which opposes a paper feed counter-roller 29, positioned below the stop 27.

[0029] The roller 28 is driven by an actuator not shown, and has a surface adapted to grip the tape and push it towards the subsequent stages.

[0030] The counter-roller 29 pushes the tape 12 against the roller 28 thanks to an actuator 30 positioned in front of the counter-roller 29.

[0031] The cutting assembly 17 which is found below the feeding assembly 16 comprises the cutting blade 35 for the tape opposed by a counter blade 36 connected to a support 37 of the counter blade 36. A spring 38 is positioned below the counter blade 36 to counter the blade 35.

[0032] The blade 35 is driven by a linear actuator 39 connected to it.

[0033] The wetting assembly 18 located below the cutting assembly 17 comprises a wetting compartment 40 having a regulator 41 for regulating the level of the wetting water, and a plug 42 for the compartment 40.

[0034] Opposite the compartment 40 is a paper guide roller 43 connected to a roller support 44 fixed to the body 15.

[0035] On the rear side of the body 15 is a gear wheel 45 connected to the tape feed roller 28 which is made to rotate by a rack 46 connected in turn to a linear actuator 47.

[0036] Laterally to the three assemblies, feeding assembly 16, cutting assembly 17 and wetting assembly 18, are the articulated rollers that apply the tape onto the cardboard boxes.

[0037] In particular, a first roller 50 is fixed, by means of a pin around which it can rotate, to a first L-shaped lever 51, where the first roller 50 is fixed to the end of the short side of the L. The first lever 51 can rotate around a first pin 52 positioned at the end of the long side of the L. Near the first pin 52, in a position spaced from the axis of the first lever 51 (long side of the L), the first lever 51 is fixed, by means of a pin around which it can rotate, to the movable end 53 of a first actuator 54. The other end of the first actuator 54 is fixed by means of a pin 55 around which it can rotate, positioned on a side (rear in the figures) of the body 15 in an elevated position close to the non-return roller 25.

[0038] The pin 55 is positioned on the body 15 at the top and alongside the feeding assembly 16, to reduce the dimensions of the body 15 as far as possible.

[0039] A second roller 60 is fixed to a second L-shaped lever 61, where the second roller 60 is fixed, by means of a pin around which it can rotate, to the end of the short side of the L. The second lever 61 can rotate around a second pin 62 positioned at the end of the long side of the L.

[0040] Near to the second pin 62, in a position 63 spaced from the axis of the second lever 61 (long side of the L), the second lever 61 is fixed, by means of a pin around which it can rotate, to a first rod 64, in turn connected to a second rod 65, which can rotate around a central pin 66. The other end of the second rod 65 is fixed, by means of a pin around which it can rotate, to the movable end 67 of a second actuator 68. The other end of the second actuator 68 is fixed by means of a pin 56 around which it can rotate, positioned on the other side (front in the figures) of the body 15 on the same axis as the pin 55 of the first actuator 54.

[0041] In an embodiment of the present invention, the pins 55 and 56 are two separate pins, each on one side of the body 15, but they could also be one single pin, since they are positioned on the same axis.

[0042] On the body there are some stops 69 to block the levers 51 and 61 in the stroke end positions.

[0043] Operation of the invention appears evident to a person skilled in the art from what has been described and in particular is as follows.

[0044] The paper tape 12 is unwound from the reel 11, passes through the paper relay rollers 13 and 14 and is inserted in the lateral opening of the taping unit throughout the length thereof.

[0045] This operation is possible since the paper transit zone is completely free and accessible.

[0046] Once this operation has been performed, the paper feed command must be given and then the paper cutting command, to correctly set up the taping unit for automatic operation.

[0047] The non-return stop 27 prevents the tape 12 from retracting relative to the work position during the cutting phase.

[0048] The counter-roller 29 and the relative actuator 30 have the function, together with the feed roller 28, of unwinding the reel and causing the wetting assembly 18 to cross the tape so that, upon arrival of the package to be sealed, the roller 60 can cause the section of wetted tape to adhere to the box.

[0049] The paper is cut by means of the cutting blade 35 which encounters the counter blade 36, the relative support 37 and the blade counter spring 38.

[0050] The paper cutting (shearing) is carried out by the pneumatic actuator 39 which moves the paper cutting blade 35 and, encountering the counter blade 36, cuts the paper tape which normally runs between the blade and the counter blade when they are in rest conditions.

[0051] The paper tape 12, pushed by the roller 28 and

by the counter-roller 29, is obliged to slide over the wetting assembly 18 which, by means of the water, activates the dry glue spread on the tape.

[0052] The compartment 40 comprises a sponge holder, a PVA sponge and a polyester fabric mesh that covers the sponge, facilitating sliding of the tape.

[0053] To access the sponge contained in the compartment 40, the compartment plug 42 must be removed.

[0054] The water present in the compartment 40 is maintained at constant level by means of a hydraulic system controlled by an electric pump and by the compartment water level regulator 41. The pump has the function of drawing water from a tank and sending it to the compartment 40 in addition to drawing excess water from the compartment 40 and returning it to the tank. The water level regulation screw 41 allows the level of water constantly present in the compartment to be fixed in order to facilitate transfer of the right quantity of water onto the paper tape.

[0055] During operation, the paper guide roller 43 and the relative support 44 guarantee contact of the paper with the wetting assembly and maintain the path guided.

[0056] The pressure rollers 50 and 60 with their lever mechanisms have the function of laying the paper tape on the box to be sealed in both the vertical part and the horizontal part.

[0057] The pressure exerted by the rollers 50 and 60 is adjustable according to the consistency and/or filling of the package.

[0058] The work of the pressure rollers 50 and 60 is controlled by the pneumatic actuators 54 and 68.

[0059] In the initial position the second roller 60 is lowered while the first roller 50 is raised inside the body 15.

[0060] In this phase the second actuator 68 extends, pushing the second rod 65 which, rotating around the pin 66, pushes the first rod 64; the latter, being connected (in a rotatable manner) at point 63 with the second lever 61, causes the second lever 61, and therefore the roller 60, to rotate downwards.

[0061] When the box arrives, the tape 12 that protrudes from below the body 15 rests on the vertical front side of the box, and therefore the second roller 60 presses and accompanies laying of the tape on the box, also during continuation on the horizontal upper surface of the box, until the end of the box is reached, and the roller 60 is raised and positioned inside the body 15 in a rest position.

[0062] At this point the first roller 50 comes into play: the roller is lowered and accompanies the tape in the last part and during its continuation on the rear vertical side of the box.

[0063] In this phase the first actuator 54 extends and, being connected to the first lever 51 at point 53, causes the first lever 51 and therefore the roller 50 to rotate downwards.

[0064] Therefore, due to their lever mechanisms, the rollers can describe an arc of a circle relative to their fulcrum from right to left and from left to right.

[0065] The lever mechanism relative to the second roller

60 is slightly more complex than that of the first roller 50, in order to reduce the overall dimensions of the taping unit.

[0066] The lever mechanism of the second roller 60 could be simplified if the second actuator 68 were fixed on the body 15 on the side opposite to where it is fixed in this embodiment, but this would increase the dimensions of the taping unit.

[0067] The flap 20 is positioned at one end of the body 15, and its dimension is such that when it is opened, the three assemblies, feeding assembly 16, cutting assembly 17 and wetting assembly 18, are uncovered and easily accessible, to facilitate insertion of the tape 12, laterally to the body 15 and perpendicularly to the path of the tape within the assemblies 16-18. When the flap is closed, it is used also as a protection for the operator to isolate the potentially dangerous cutting assembly 17.

[0068] Said flap 20 also facilitates maintenance and control of the wetting assembly.

[0069] The flap 20 therefore allows total visibility of the path followed by the tape 12 through the feeding assembly 16, the cutting assembly 17 and the wetting assembly 18 guaranteeing that the user can operate in safety.

[0070] Alternatively to the flap 20 it is possible to provide a body 15 having a vertical open slit to facilitate insertion of the tape 12 into the body 15.

[0071] The entire operation described above is carried out with pneumatic control actuators but they could also be electric actuators. Everything is also controlled by microprocessors in a known manner.

[0072] The taping unit has been described and shown to fix the gummed paper tape on the upper part of a box. The same unit can also be used to fix the gummed paper tape on the lower part of a box. In both cases the tape fixed on the box also partially involves the front and rear sides of the box.

[0073] Given the reduced dimensions, the taping unit thus described can be easily used to replace taping units already installed.

[0074] Any materials and any dimensions can be used for the taping unit according to requirements and the state of the art.

[0075] The system thus conceived is subject to numerous modifications and variations, all falling within the scope of the inventive concept; furthermore, all the details can be replaced by technically equivalent elements.

Claims

1. A taping unit for wetting gummed paper tapes (12), for automatic package sealing machines, having a body (15) comprising: a feeding assembly (16) for feeding the tape (12); a cutting assembly (17) for cutting the tape (12); a wetting assembly (18) for wetting the tape (12); a first articulated roller (50); a second articulated roller (60); **characterized in that** said feeding assembly (16), said cutting assembly

(17) and said wetting assembly (18) are combined in one body and arranged so that said tape (12) moves vertically inside said body (15); said body (15) comprises a vertical opening for inserting the tape from said opening, perpendicular to the path thereof; said first articulated roller (50) and said second articulated roller (60) are driven by a first actuator (54) and by a second actuator (68); said first actuator (54) and said second actuator (68) are fixed on said body (15) each by means of a pin (55, 56) each, positioned on the same axis.

2. The taping unit according to claim 1 **characterized in that** said first actuator (54) and said second actuator (68) are fixed in the same point (55) alongside said feeding assembly (16).
3. The taping unit according to claim 1 **characterized in that** said first articulated roller (50) is fixed to a first lever (51) which can rotate around a first pin (52); said first lever (51) is fixed to the movable end (53) of said first actuator (54), in a position spaced from the axis of said first lever (51).
4. The taping unit according to claim 1 **characterized in that** said second articulated roller (60) is fixed to a second lever (61) which can rotate around a second pin (62); said second lever (61) is fixed close to the second pin (62), in a position (63) spaced from the axis of the second lever (61), to a first rod (64), in turn connected to a second rod (65), which can rotate around a central pin (66); the other end of the second rod (65) is connected to the movable end (67) of said second actuator (68).
5. The taping unit according to claim 1 **characterized in that** said first lever (51) is L-shaped.
6. The taping unit according to claim 1 **characterized in that** said second lever (61) is L-shaped.
7. The taping unit according to claim 1 **characterized in that** said vertical opening also consists of a flap (20).
8. The taping unit according to claim 7 **characterized in that** said flap (20) is sized so that when open, the operator can laterally access said feeding assembly (16), said cutting assembly (17) and said wetting assembly (18).
9. The taping unit according to claim 1 **characterized in that** said feeding assembly (16), said cutting assembly (17) and said wetting assembly (18) are arranged vertically.

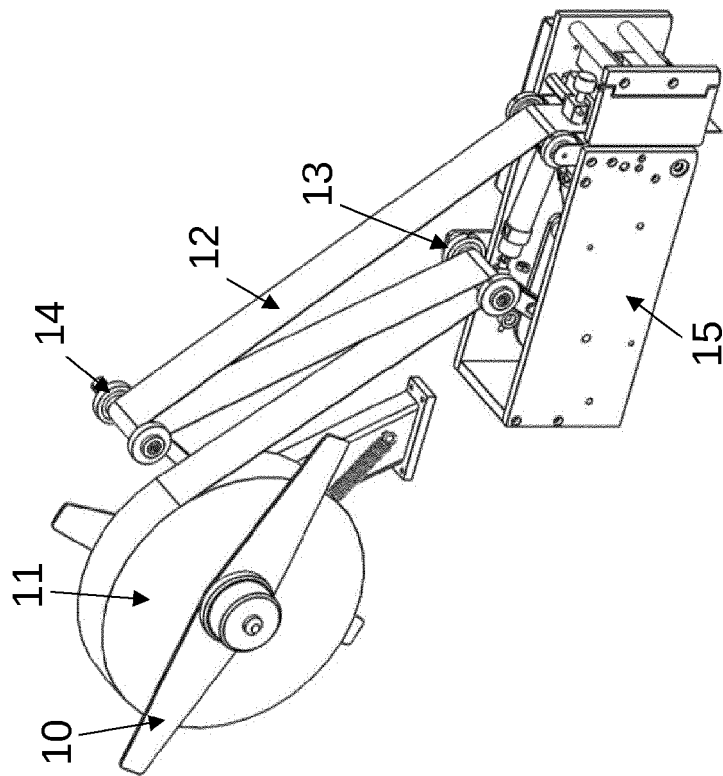


Fig. 1

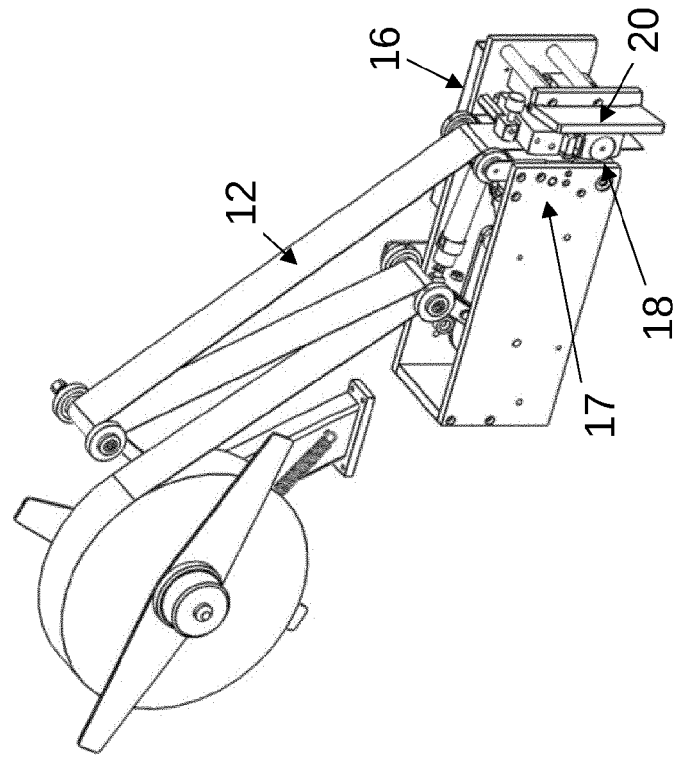


Fig. 2

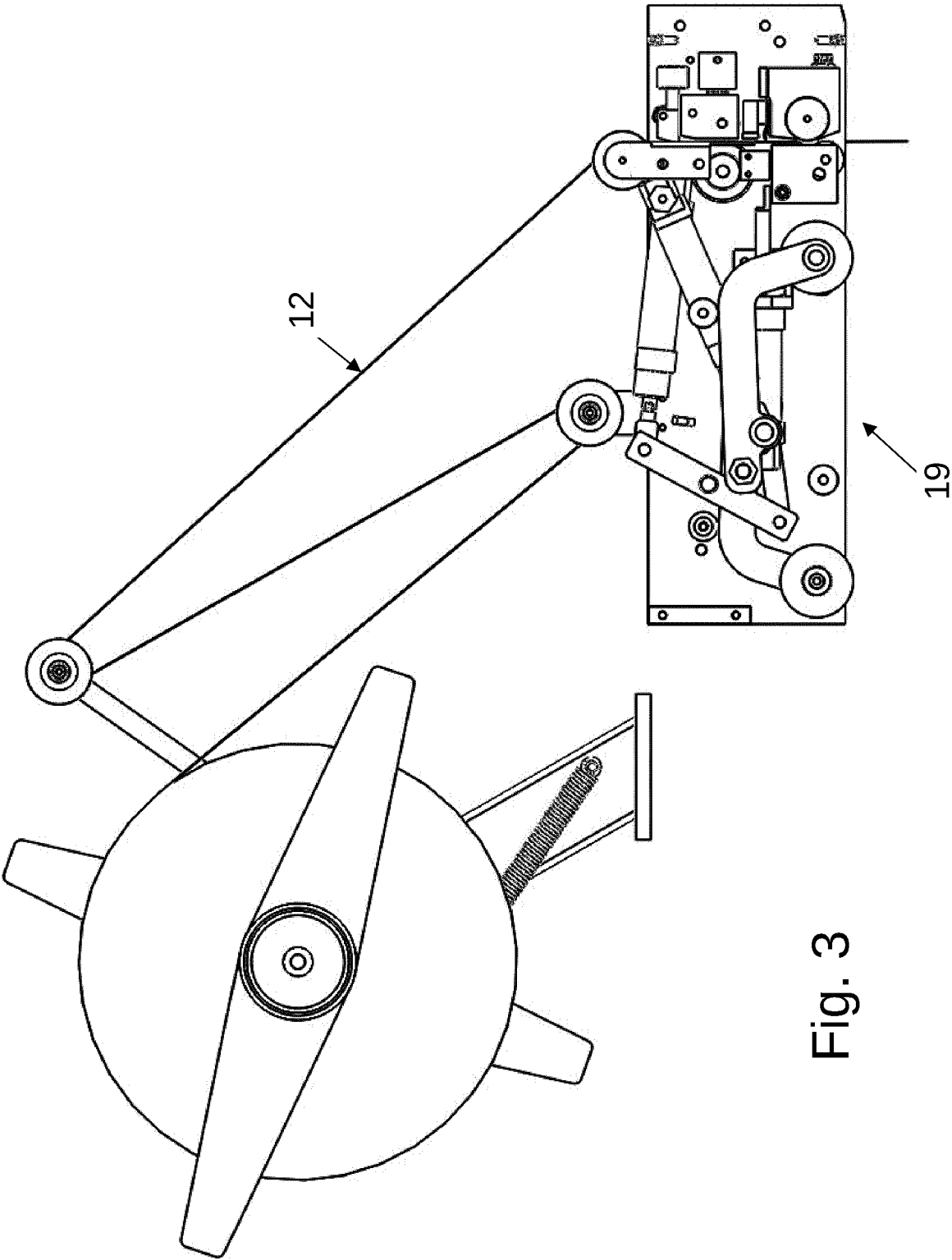


Fig. 3

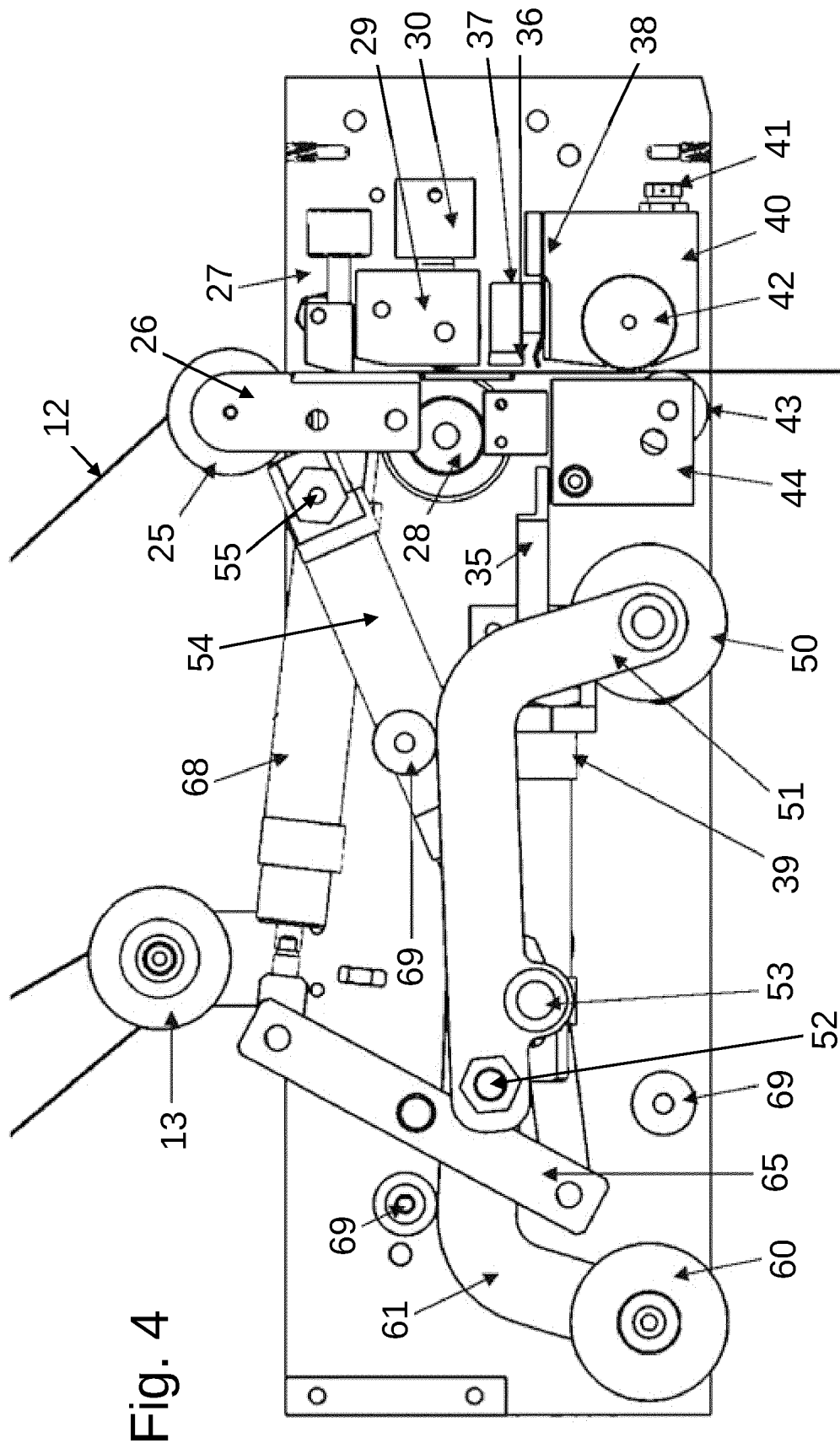
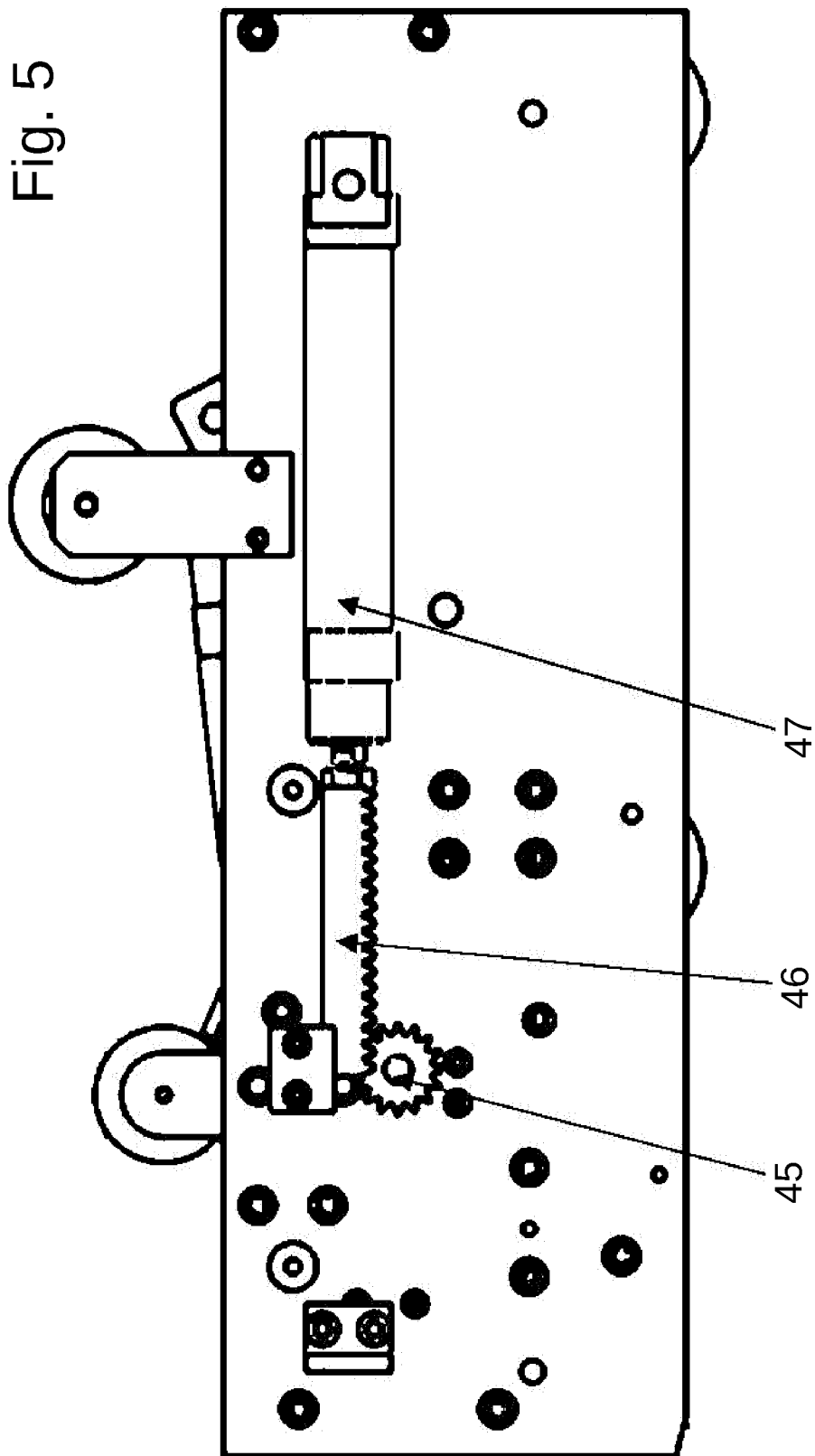


Fig. 4



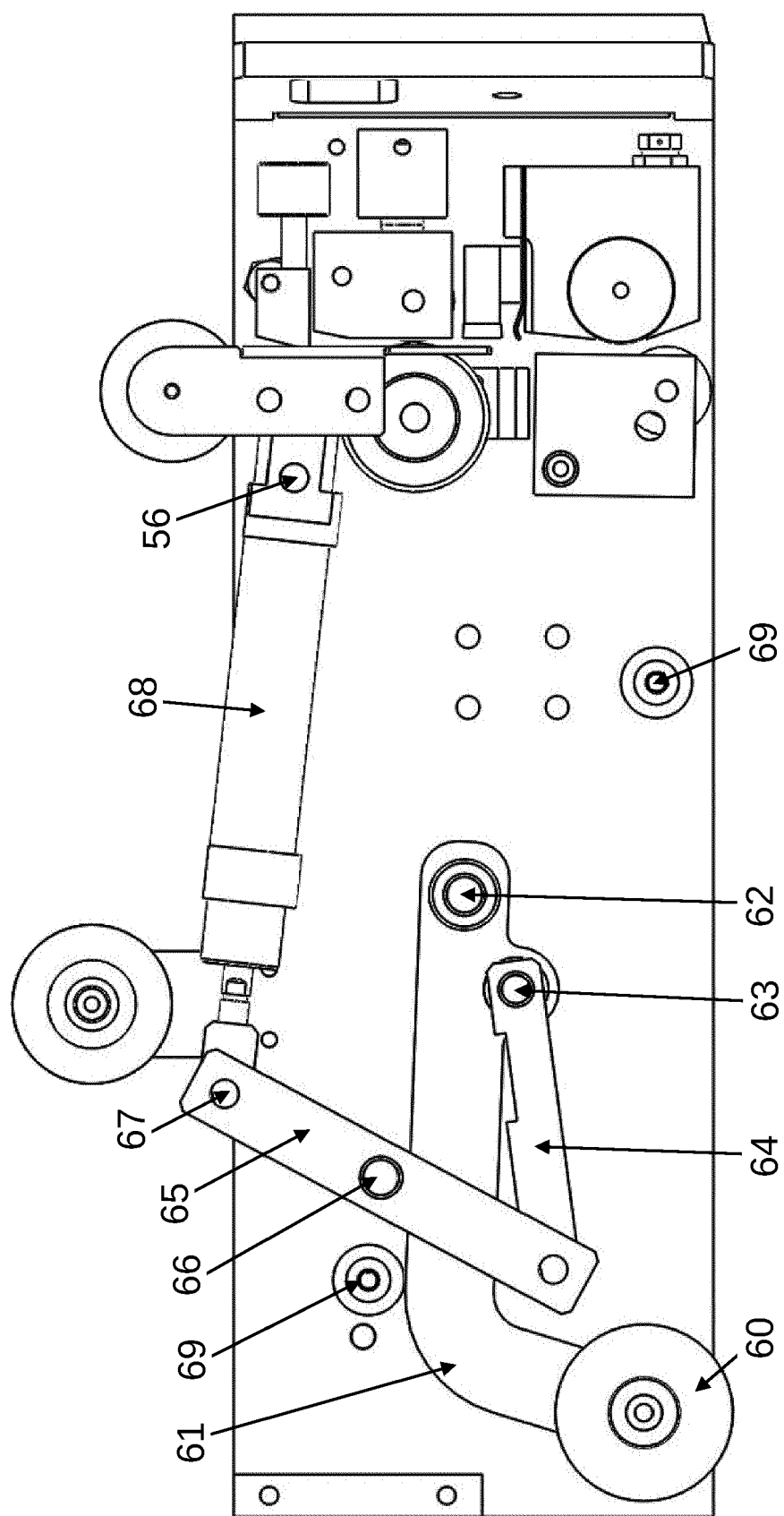


Fig. 6

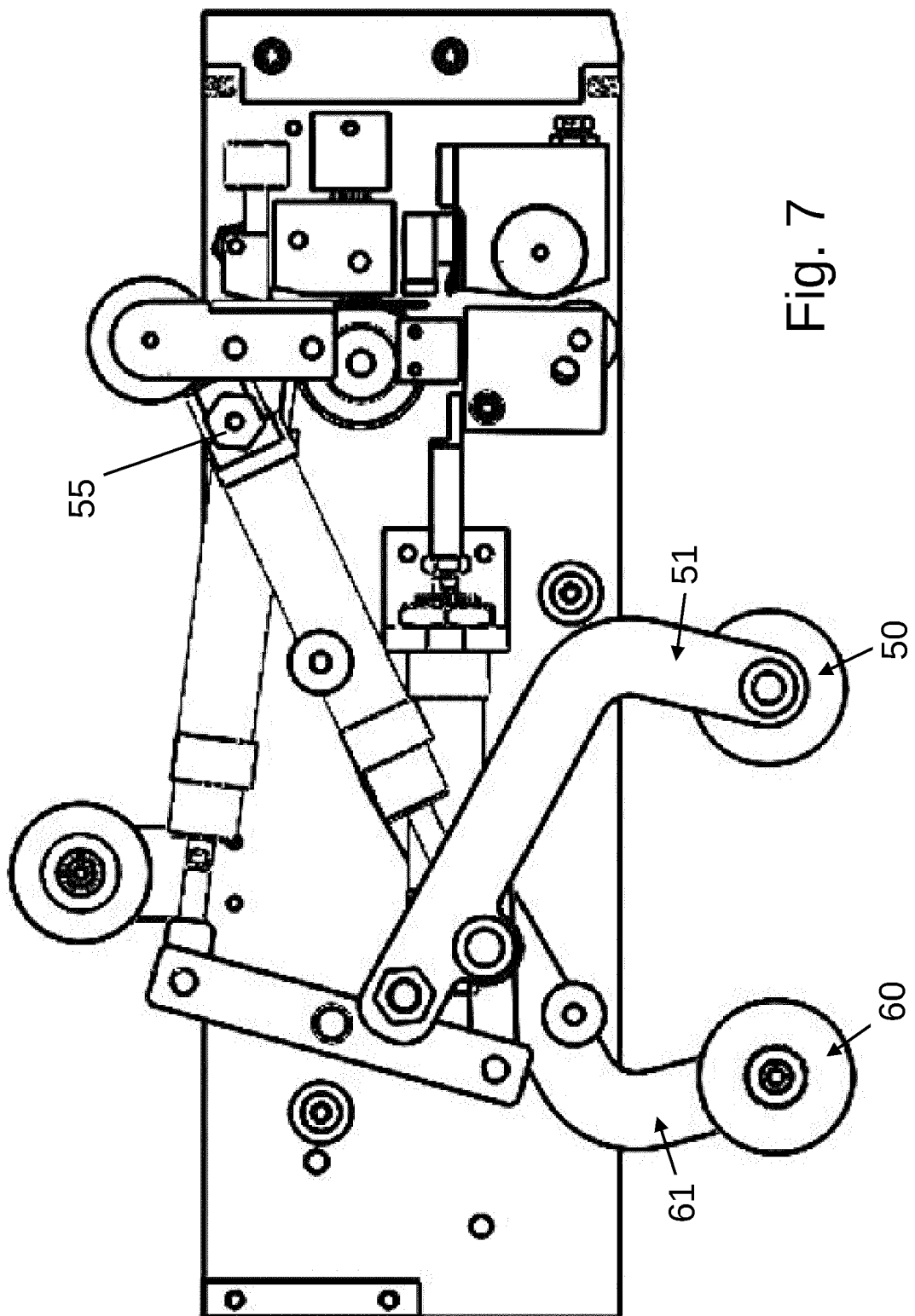


Fig. 7

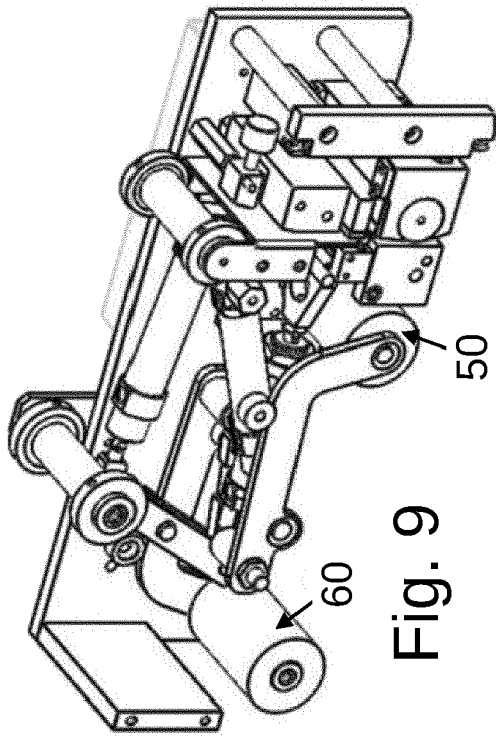


Fig. 9

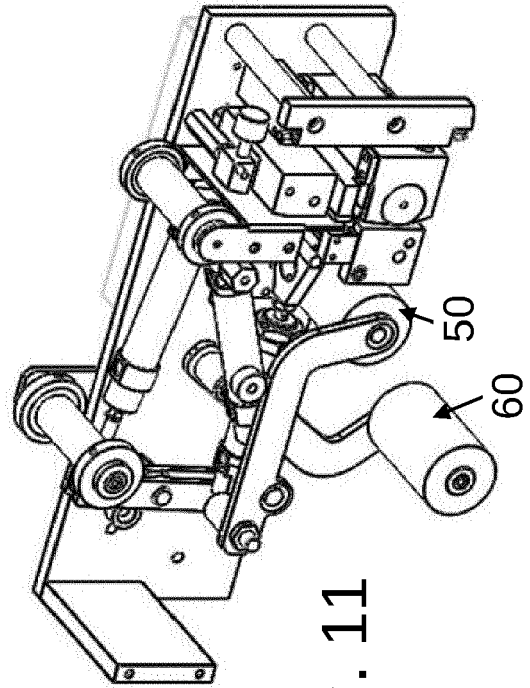


Fig. 11

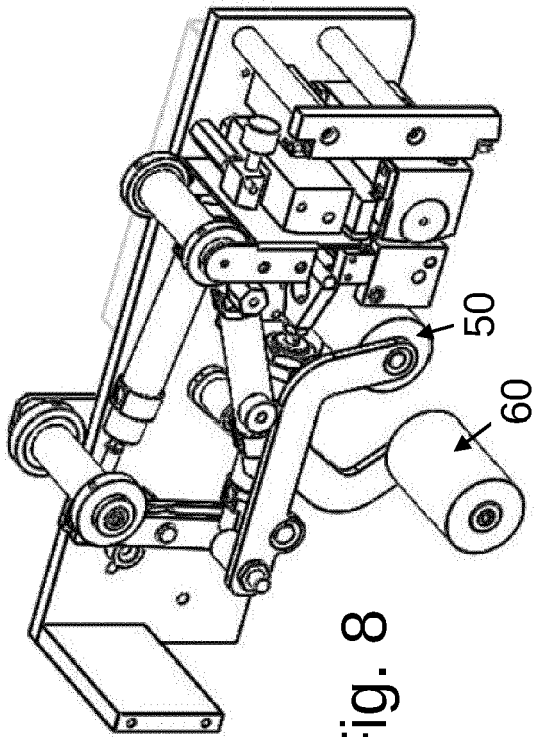


Fig. 8

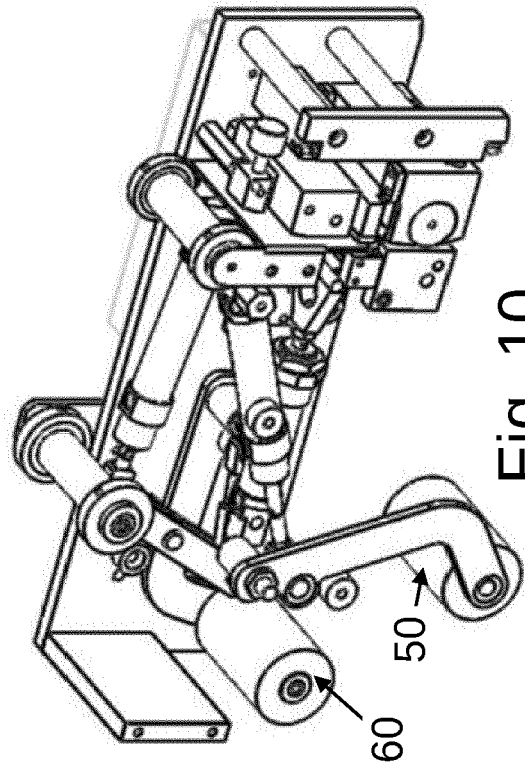


Fig. 10



EUROPEAN SEARCH REPORT

Application Number
EP 21 15 0783

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 June 2021	Examiner Cescutti, Gabriel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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