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(54) **Edgebanding group**

(57) In an edgebanding group, used to glue an edge element to a side of a panel-shaped workpiece, an engaging device (4) is configured for receiving an edge-pressing device (3). A series of interchangeable edge-pressing devices and a device for automatically changing the edge-pressing devices are also provided.

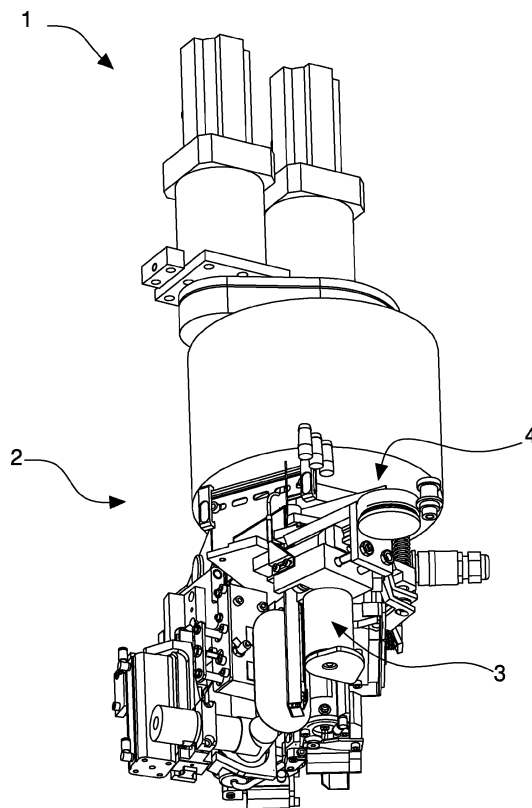


Fig. 1

Description

Background of the invention

[0001] The invention relates to an edgebanding group intended in particular for producing panel-shaped edged elements.

[0002] Specifically, but not exclusively, the invention can be used for gluing an edge to the perimeter of a panel-shaped element having a relatively complex shape. It is possible to use the invention in the case of a numerical control machining centre or in a multifunction machine, in particular for machining workpieces made of wood or material similar to wood.

[0003] The prior art comprises edgebanding units or groups configured for applying the glue to the side of the panel, or to the edge to be applied to the side of the panel, and to press the edge (generally consisting of a strip of material) against the raw section of the panel to make the two elements adhere together.

[0004] An edgebanding group of known type comprises an edge-pressing device that is used to press the glued edge against the side of the panel and is particularly suitable for pressing a given type of edge. For example, the use of a pressure device of the rolling type is known that comprises in general at least one pressing roller, in which it is preferable to increase the diameter of the roller as the stiffness of the edge to be applied increases.

[0005] In general, it is known using different pressure devices in function of the type of profile of the element to be edged. For example, the use of pressure rollers of small diameter is known to press edges on curved profiles with relatively reduced internal radiiuses. The use of pressure devices of the sliding type is also known that have a shaped pad that is suitable for operating on profiles with sharp internal edges, or pressure devices of the roller unit type that are suitable, for example, for edges with a special shape.

[0006] Known edgebanding groups have a problem when, in the case of machining a panel, it is opportune to use edge-pressing devices of different types.

[0007] If, merely by way of example, it is wished to produce a panel shaped with a side edged by a stiff edge element, for example an edge in solid wood, it is opportune to use an edge-pressing roller of great diameter. If the panel has another side with a reduced internal radius it is not possible to edgeband the entire perimeter with the same pressing roller. Currently, the machining programme has to be interrupted, the edgebanding group has to be modified by fitting a suitable pressing device and then machining has to be started again automatically with the second part of the programme.

[0008] In general, the prior art has a problem when edgebanding operations have to be performed on panels that require the use of different types of edge-pressing devices.

Summary of the invention

[0009] An object of the invention is to solve the afore-said prior-art problem.

[0010] Another object of the invention is to make an edgebanding group that is able to work on workpieces having relatively complex profiles.

[0011] An advantage of the invention is to provide an edgebanding group for numerical control machining centres that is able to perform automatically a complete edgebanding programme, in particular for panel-shaped workpieces with relatively complex profiles.

[0012] Another advantage consists of avoiding interrupting a machining programme for replacing the edge-pressing device. Such objects and advantages and still others are all achieved by the edgebanding group according to any of the following claims.

[0013] The edgebanding group comprises an engaging device that is able to receive an edge-pressing device and a series of edge-pressing devices that are mutually interchangeable.

[0014] The edgebanding group is predisposed so as to be able to change rapidly the edge-pressing device in function of the profile of the workpiece being machined and/or of the edge element used.

[0015] In particular, the edgebanding group is provided with an automatic rapid engaging device by means of which it is possible selectively to insert and release on the unit different edge-pressing devices.

[0016] The series of interchangeable edge-pressing devices can be housed in a store.

[0017] It will be possible, for example by means of a rapid change device provided with gripping means, to deposit in the store and/or remove from the store the edge-pressing devices according to the type of machining to be performed.

[0018] The rapid engaging device could be provided with means for supplying energy to the various edge-pressing devices, which, time by time, are located on the edgebanding group in the work position, this energy can be, for example, mechanical and/or pneumatic and/or electric energy.

Short description of the drawings

[0019] The invention can be better understood and implemented with reference to the attached drawings, which illustrate some embodiments thereof by way of non-limiting example.

Figure 1 shows a perspective view of an edgebanding group.

Figure 2 is an enlarged detail of figure 1.

Figure 3 shows the unit of figure 1 without the edge-pressing device.

Figure 4 is an enlarged particular of figure 3.

Figure 5 shows an enlarged detail of the edgebanding group in figure 1.

Figure 6 shows the edgebanding group of figure 1 with a series of interchangeable edge-pressing devices 3, 3a, 3b and 3c that can be operationally associated in a selective manner with the same unit.

Figures 7 to 9 show on an enlarged scale the interchangeable devices 3a, 3b and 3c of figure 6.

Detailed description

[0020] With reference to figure 1, an edgebanding group has been generally indicated by 1 that is suitable for gluing edge elements to the perimeter of panel-shaped workpieces. The edgebanding group can be used, for example, in the case of a numerical control machining centre, suitable for machining workpieces made of wood or material similar to wood, which is provided with other operating units (for example milling units, boring units, etc).

[0021] The edgebanding group 1 comprises a distributing device 2 configured for distributing a layer of glue in order to glue an edge element to a side of a panel-shaped workpiece being machined. The distributing device 2 may comprise any of the glue-distributing devices of known type that are currently used in edgebanding groups for edgebanding panel-shaped workpieces. For this reason, the glue-distributing device 2 is not disclosed in further detail.

[0022] The edgebanding group 1 comprises an edge-pressing device 3 configured for pressing an edge element against a side of the workpiece being machined. The edge-pressing device 3 may comprise a device of rolling type (as in the specific case of the figure 1 in which it is of the roller type) or of the sliding type.

[0023] The edgebanding group 1 comprises an engaging device 4 configured for receiving the edge-pressing device 3 in a removably coupled manner in a work position.

[0024] The engaging device 4 may comprise, as in the specific case, a guide 5 with a rectilinear axis predisposed for slidable coupling with a corresponding guiding element 6 with which the edge-pressing device is provided. The engaging device 4 may moreover have a locking system provided with at least one locking element, which is movable in a direction that is transverse to the axis of the guide, to lock in position the edge-pressing device 3. The locking system comprises an actuator (for example a linear actuator) which can be connected (as in the specific example) by at least one lever 7 and with the action of at least one elastic element 8, to the movable locking element that, in the case in point, has the shape of a slideway 9 that defines at least partially a side of the guide 5.

[0025] The edgebanding group 1 further comprises one or more further edge-pressing devices 3a, 3b, 3c, each of which is configured for pressing an edge element against a side of the workpiece being machined. The various edge-pressing devices 3, 3a, 3b, 3c can be, as in the specific case, different from one another and suit-

able for working in a specific operating situation, according to the type of edge element to be glued and/or the type of panel being machined to be edgebanded and/or the type of side to which to apply the edge element. Also the further edge-pressing devices 3a, 3b, 3c can comprise devices of the rolling type and/or of the sliding type. In particular, the various edge-pressing devices 3, 3a, 3b, 3c are each provided with at least one pressing element that is suitable for a specific type of edge pressing. In the specific case, for example, the devices 3, 3a, 3b, 3c are provided with pressing elements, respectively, 30 (roller of relatively large diameter), 31 (shaped pad), 32 (pair of rollers) and 33 (roller of relatively small diameter). It is possible to provide other types of pressing element of known type.

[0026] Each of the further edge-pressing devices 3a, 3b, 3c is configured for being received by the engaging device 4 in a removably coupled manner in a work position, similarly to the pressing device 3.

[0027] The edgebanding group 1 can be used in the case of a numerical control machining centre comprising a store (not shown) for housing the further edge-pressing devices 3a, 3b, 3c that, momentarily, are not operationally associated with the group part that is actually working.

[0028] The edgebanding group 1 can be further operationally associated with an automatic change device 10 configured for replacing the edge-pressing device. The automatic change device 10 is in particular predisposed for removing the edge-pressing device 3 released by the engaging device 4 and for placing the edge-pressing device 3 in the store, and for removing one of the further edge-pressing devices 3a, 3b, 3c from the store and coupling one of the further edge-pressing devices 3a, 3b, 3c with the engaging device 4 in a work position.

[0029] The various edge-pressing devices 3, 3a, 3b, 3c each comprise an easy-to-grasp zone 11 predisposed for coupling with a corresponding movable grasping element 12 of the automatic change device. The grasping element 12 can be, for example, of the gripper type. The easy-to-grasp zone 11 may comprise, for example, an external side surface (for example cylindrical) that is suitable for being grasped on two opposite sides by a grasping element. This easy-to-grasp zone 11 can be the same for all the devices.

[0030] The engaging device 4 is provided with means for supplying driving energy to an edge-pressing device that is momentarily received in a work position. The edge-pressing device is thus configured for being supplied by the aforesaid supplying means, which can be, for example, of the electric energy and/or fluid and/or pneumatic and/or mechanical type. It is, for example, possible to provide for the engaging device 4 comprises an electric energy socket (which is usable as a source of heating) and/or a source of pneumatic energy (which is usable as a source of cooling).

[0031] The engaging device 4 can be predisposed, to ensure safety, in such a manner as to lock automatically

the edge-pressing device in the event of an energy supply failure.

[0032] An electronic control unit will be predisposed, which is not illustrated, which is programmed for controlling the operation of the various glue-distributing, edge-pressing, coupling and automatic change devices. In particular, the control unit is programmed for commanding the engaging device 4 for assuming a coupling configuration and a releasing configuration in which, respectively, it engages and disengages the edge-pressing device that is momentarily in the work position.

[0033] The control unit is further programmed in such a manner as to control the automatic change of the pressing device so as not to have to stop machining, for example if the workpiece being machined has a special shape that requires an edge-pressing device to be used in a first machining step and a different edge-pressing device to be used in a subsequent step.

[0034] Inserting and extracting the various edge-pressing devices may comprise, as in the specific case, relative sliding between the guiding element 6 (which is also substantially the same for all the devices 3, 3a, 3b, 3c) and the guide 5. After insertion, the edge-pressing device is locked by moving the locking element (in the case in point the slideway 9) transversely.

[0035] In the attached figures a type of drive of the locking element has been illustrated that comprises a lever system 7, even if it is possible to provide any type of energy transmission system from an actuator to the locking element.

[0036] It is possible to provide for the engaging device comprising - instead of a grasping system with a sliding guide (for example a dovetail guide as in the illustrated example) and a removable locking device - a grasping system of the cone type (for example an HSK cone or a cone of another known type), like one of those used for the removable attachment of tools in toolholder spindles.

Claims

1. Edgebanding group comprising:

- a. a distributing device (2) configured for distributing a layer of glue for gluing an edge element on a side of a workpiece;
- b. at least one edge-pressing device (3) configured for pressing an edge element against a side of a workpiece;
- c. an engaging device (4) configured for receiving said edge-pressing device (3) in a removably coupled manner in a work position.

2. Edgebanding group according to claim 1, comprising one or more further edge-pressing devices (3a; 3b; 3c), each of which is configured for pressing an edge element against a side of a workpiece, each of said one or more further edge-pressing devices (3a; 3b;

3c) being further configured for being received by said engaging device (4) in a removably coupled manner in a work position.

3. Edgebanding group according to claim 2, operationally associated with a store for housing said one or more further edge-pressing devices (3a; 3b; 3c), and further operationally associated with an automatic change device (10) configured for removing said edge-pressing device (3) released by said engaging device (4) and for placing the engaging device (4) in said store, and/or for removing one of said one or more further edge-pressing devices (3a; 3b; 3c) from said store and for coupling said one of said one or more further edge-pressing devices (3a; 3b; 3c) with said engaging device (4).

4. Edgebanding group according to claim 3, wherein said edge-pressing device (3) and said one or more further edge-pressing devices (3a; 3b; 3c) each comprise an easy-to-grasp zone (11) predisposed for coupling with a corresponding movable grasping element (12) of said automatic change device (10).

5. Edgebanding group according to any preceding claim, wherein said engaging device (4) is provided with means for supplying drive energy to an edge-pressing device (3; 3a; 3b; 3c) that is received by said engaging device (4) in a work position, said edge-pressing device (3; 3a; 3b; 3c) being configured for being supplied by said supplying means by means of electric and/or fluid and/or pneumatic and/or mechanical energy.

6. Edgebanding group according to claim 5, wherein said engaging device (4) is configured for automatically locking said edge-pressing device (3; 3a; 3b; 3c) in the event of an energy supply failure.

7. Edgebanding group according to any preceding claim, comprising a control unit predisposed for commanding the operation of said distributing device (2), of said edge-pressing device (3) and of said engaging device (4), said engaging device being provided with the possibility of assuming a coupling configuration and a releasing configuration wherein, respectively, it engages and disengages said edge-pressing device, said engaging device being connected to said control unit so as to pass between said coupling and releasing configurations upon the command of said control unit.

8. Edgebanding group according to any preceding claim, wherein said engaging device (4) comprises a guide (5) predisposed for slidable coupling with a corresponding guiding element (6) with which said edge-pressing device (3) and/or each of said further edge-pressing devices (3a; 3b; 3c) is provided, said

engaging device having a locking element (9) that is movable in a direction that is transverse to an axis of said guide (5) for locking said edge-pressing device and/or each of said further edge-pressing devices.

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9. Edgebanding group according to any one of claims 1 to 7, wherein said engaging device (4) comprises a cone-type connection system.

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10. Edgebanding group according to any preceding claim, wherein said edge-pressing device (3) is of the sliding or of the rolling type.

11. Edgebanding group according to any one of claims 2 to 8, wherein said one or more further edge-pressing devices (3a; 3b; 3c) comprise one or more devices of the sliding and/or of the rolling type.

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12. Numerical control machining centre comprising: an edgebanding group according to any one of claims 3 to 11; a store for housing said one or more further edge-pressing devices (3a; 3b; 3c); and an automatic change device (10) configured for removing said edge-pressing device (3) released by said engaging device (4) and for placing the edge-pressing device (3) in said store, and/or for removing one of said one or more further edge-pressing devices (3a; 3b; 3c) from said store and for coupling it with said engaging device (4).

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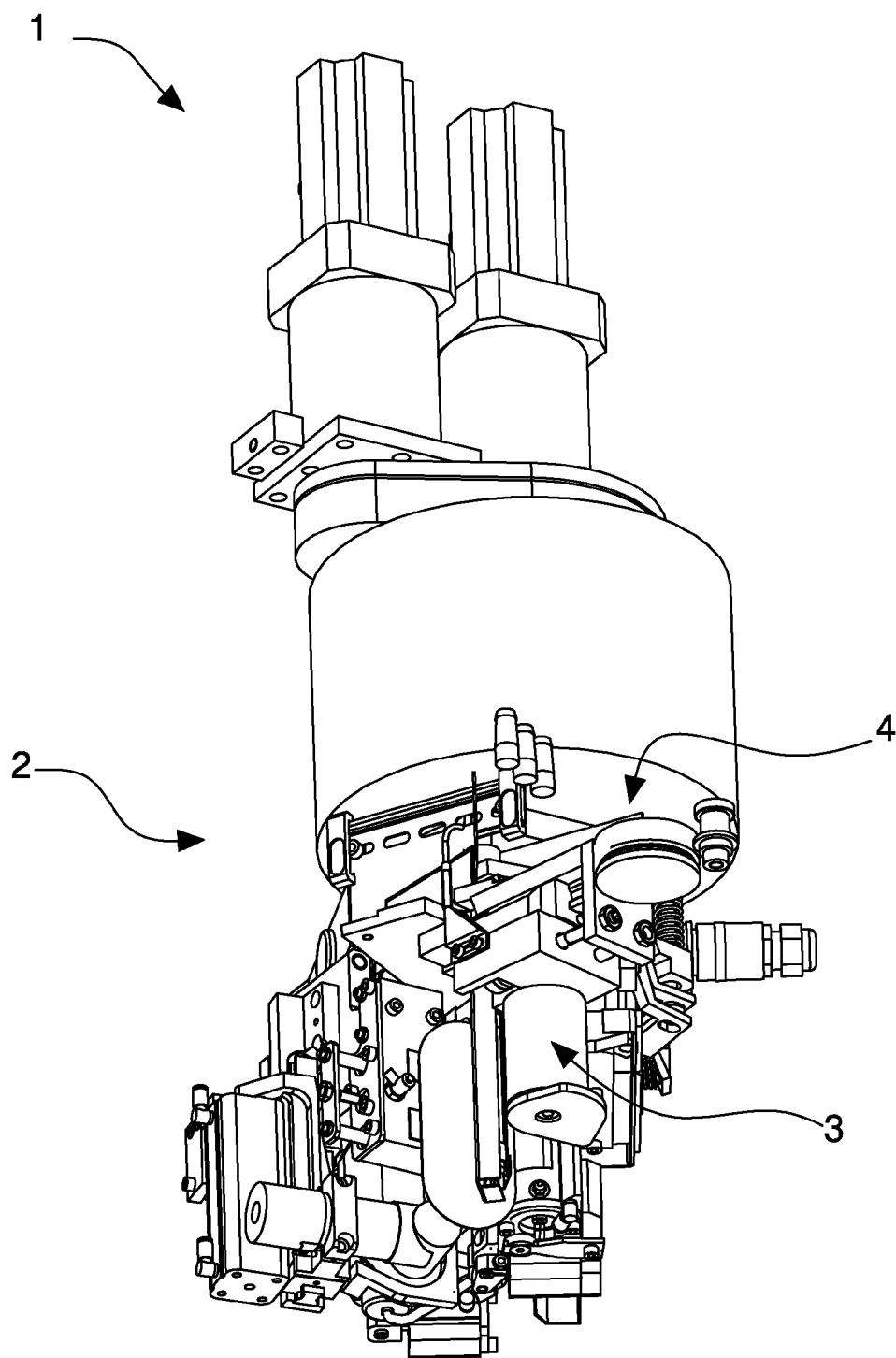


Fig. 1

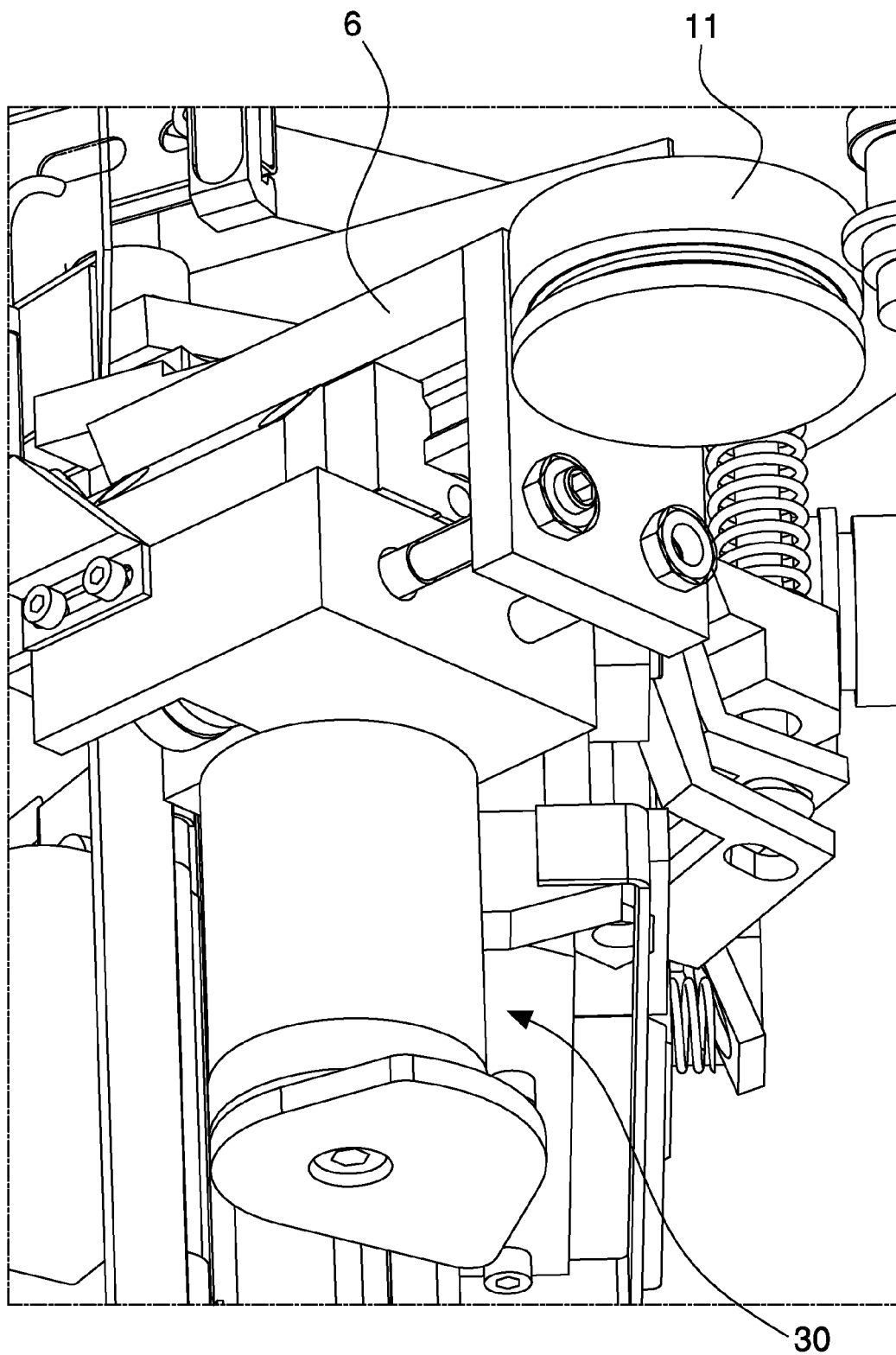


Fig. 2

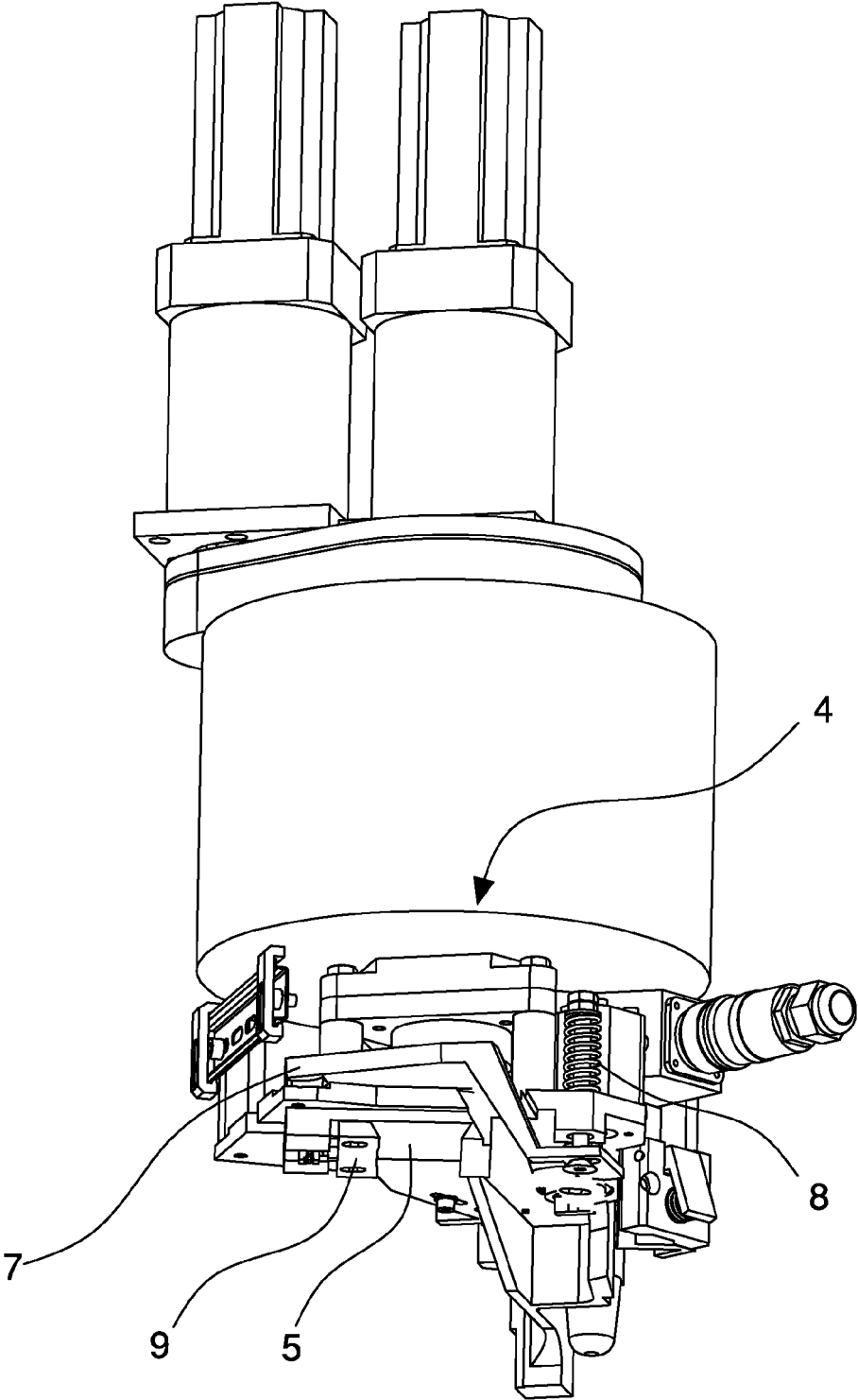


Fig. 3

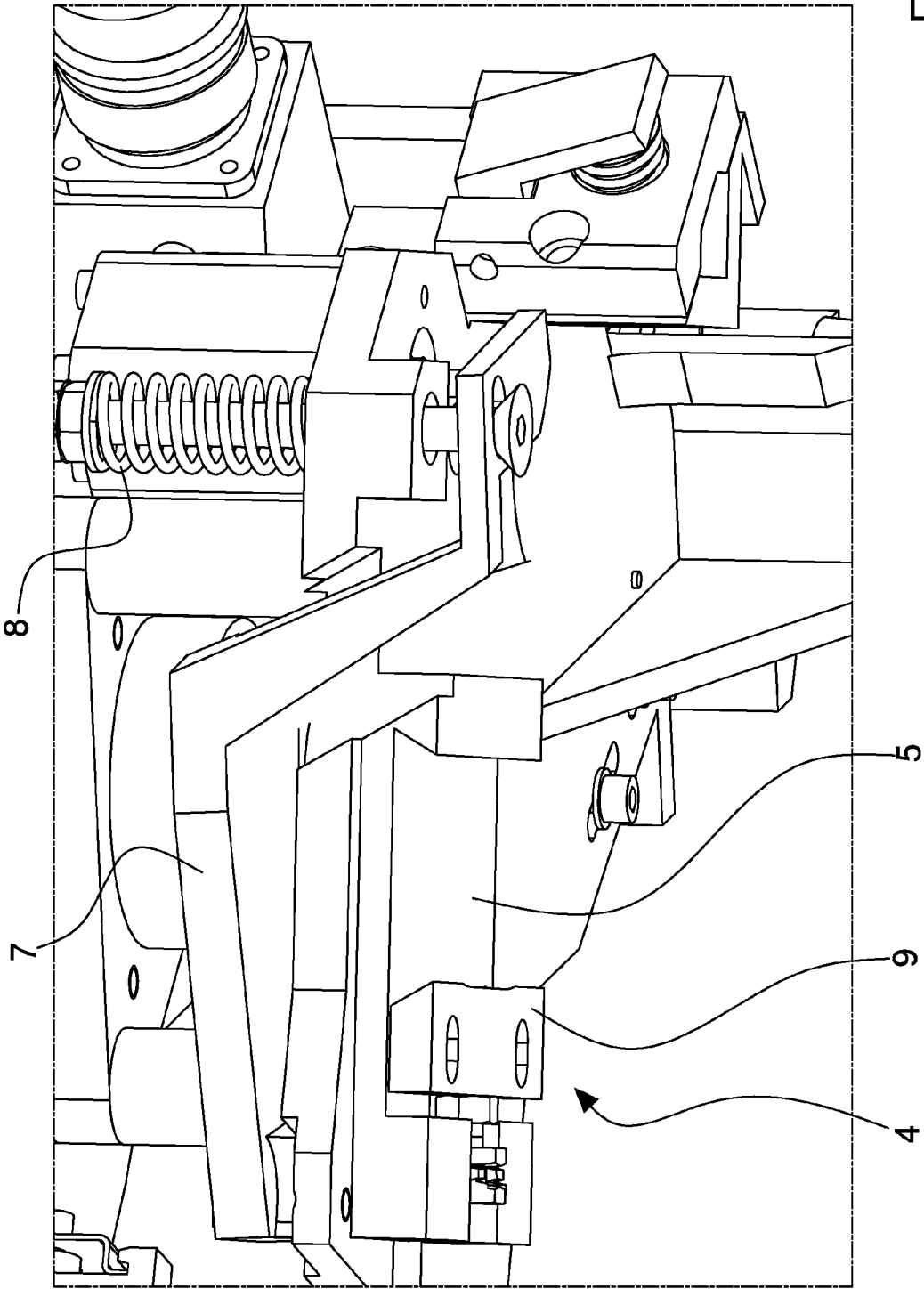


Fig. 4

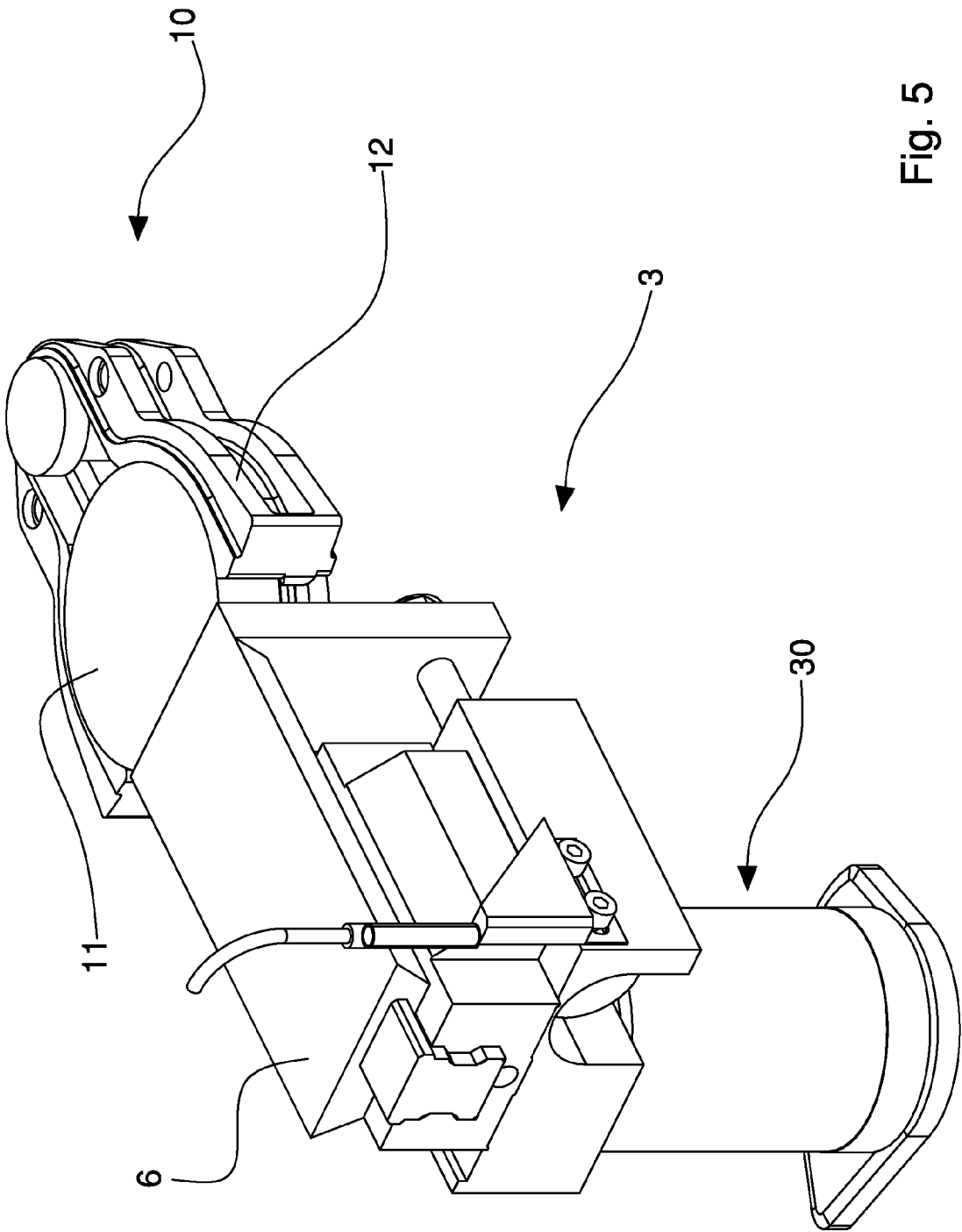


Fig. 5

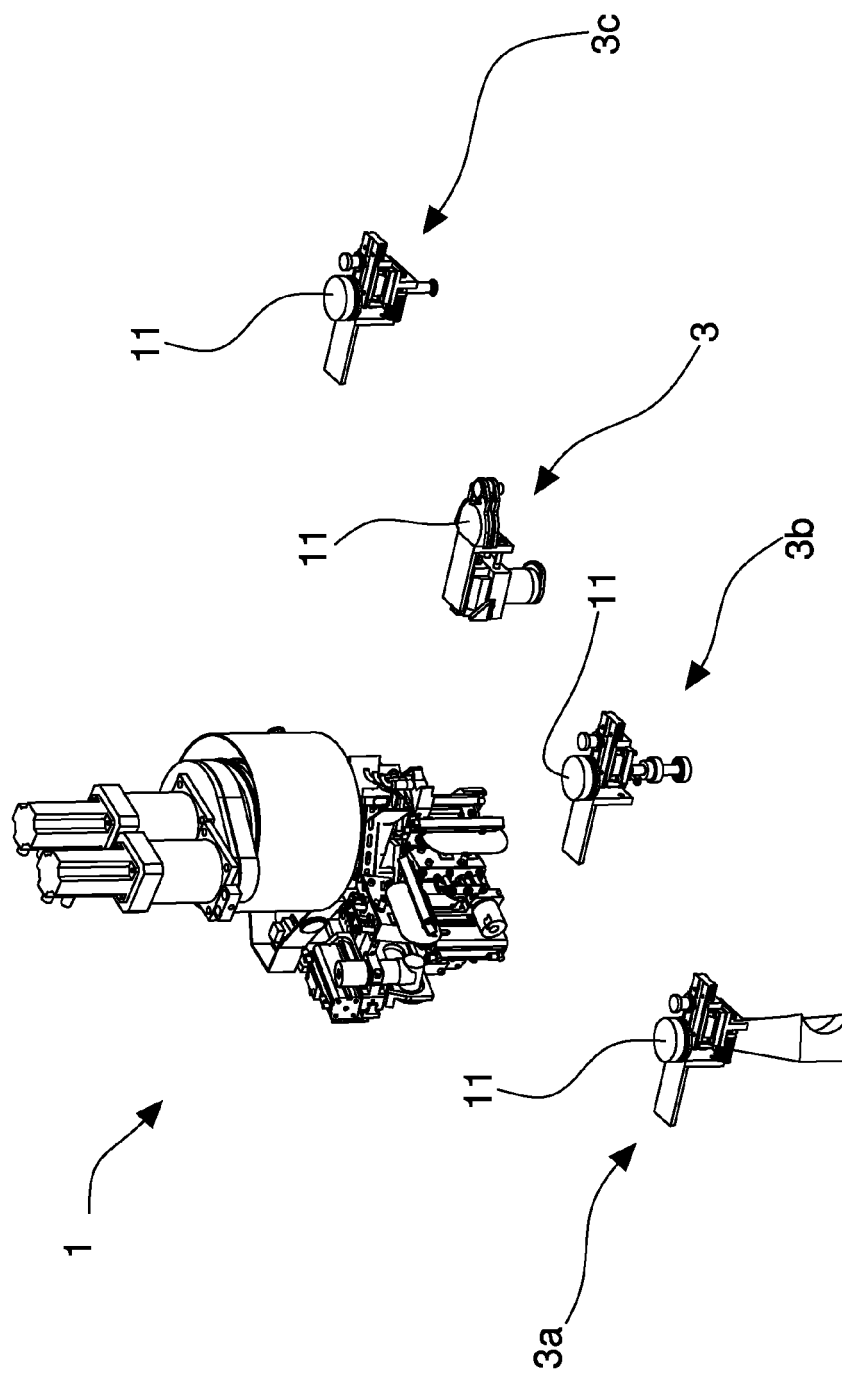


Fig. 6

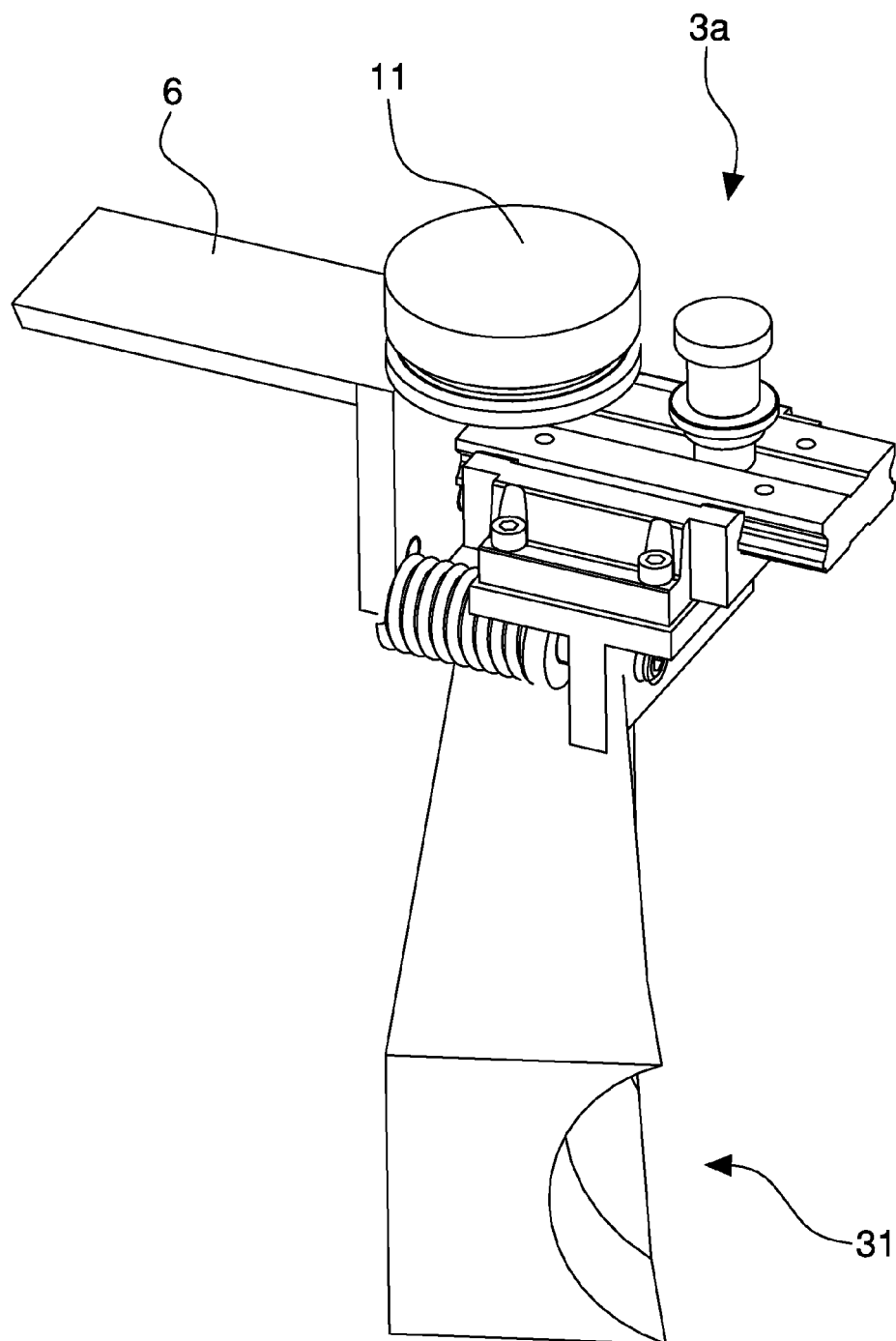


Fig. 7

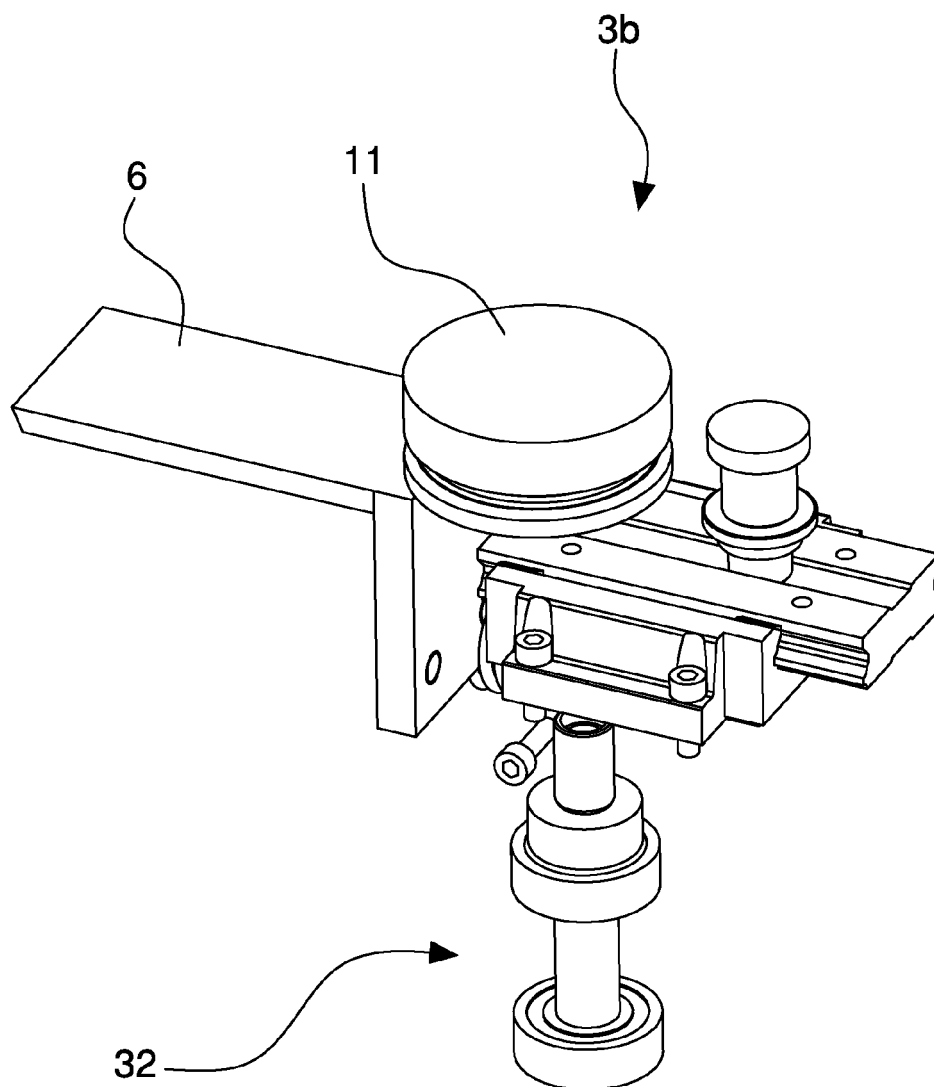


Fig. 8

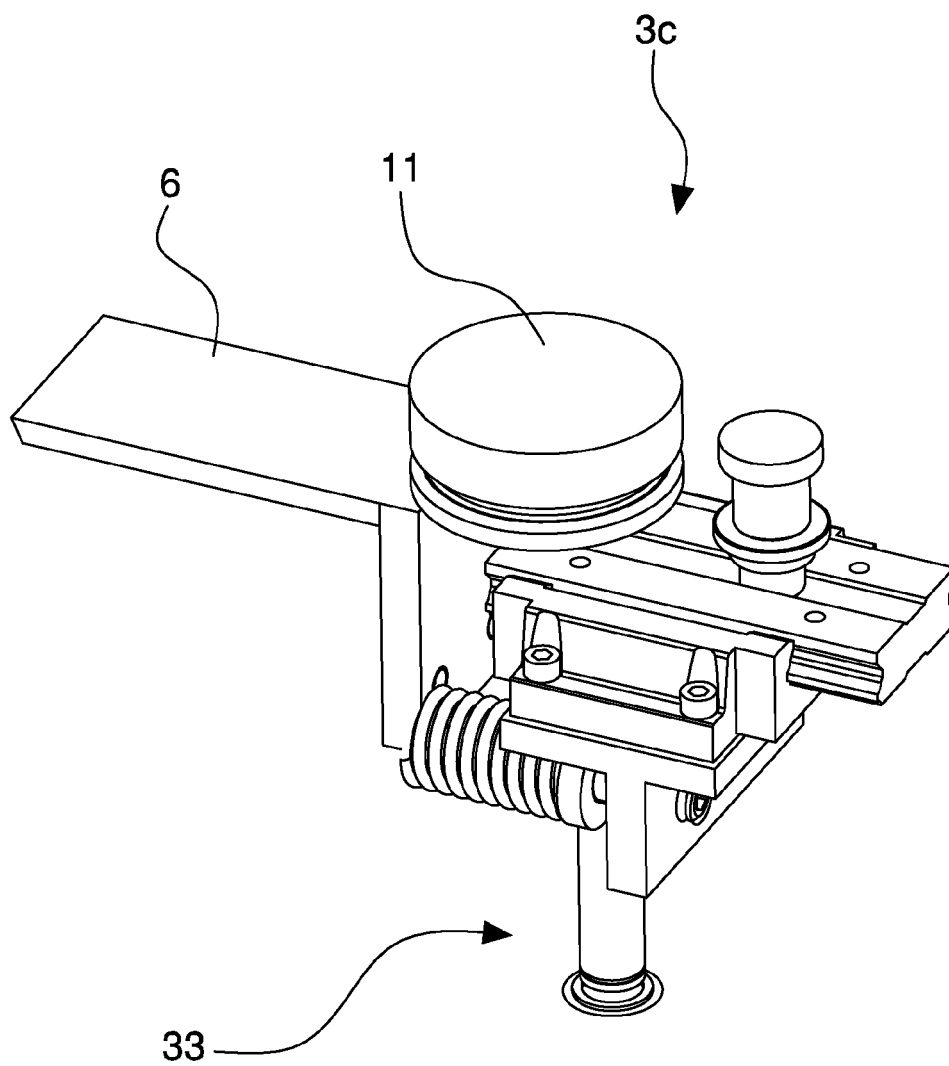


Fig. 9



EUROPEAN SEARCH REPORT

Application Number
EP 11 15 1361

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 728 561 A1 (HORNBERGER MASCHBAU GMBH [DE]) 28 August 1996 (1996-08-28) * abstract * * column 1, line 3 - line 17 * * column 1, line 49 - line 58 * * column 2, line 4 - line 19 * * column 3, line 10 - line 24 * * column 3, line 36 - line 40 * * column 7, line 1 - line 21 * * column 7, line 56 - column 8, line 42 * * figures *	1-10,12	INV. B27D5/00
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X	EP 1 785 243 A1 (SCM GROUP SPA [IT]) 16 May 2007 (2007-05-16) * abstract * * paragraph [0011] * * paragraph [0013] * * paragraphs [0017], [0018] * * paragraph [0020] * * paragraph [0024] * * paragraph [0028] * * figures *	1,2,8, 10,11	TECHNICAL FIELDS SEARCHED (IPC) B27D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 29 April 2011	Examiner Hamel, Pascal
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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