

Fig. 2

Description

[0001] The present invention relates to a glue distributing apparatus, in particular an apparatus for distributing glue in a woodworking machine, such as for example an edgebanding machine or a squaring edgebanding machine.

[0002] Such machines, which typically perform edgebanding operations on panels, tables, flat elements of wood or similar material, comprise glue distributing apparatuses or gluing units that deposit or spread a layer of adhesive glue on belts, strips, beads to be applied to edges of panels, or directly to the edges of said panels.

[0003] The adhesive used is generally a hot-melt glue that has to be appropriately heated before being applied "hot" to surfaces to be joined. The glue is applied by means of a suitable rotating gluing roller, that has a knurled or rough external surface, which retains and conveys the glue, supplied by a tank or pot. The latter is made of a non-adhering material and is provided with heating elements, such as electric resistances, for uniformly heating and keeping fluid the glue.

[0004] In some gluing units the glue tank is positioned below a work area and suitable supplying means, for example screw conveyor, transfers the glue from said lower tank to the gluing roller.

[0005] However, such apparatuses have the drawback of heating the work area excessively, as the tank with heat resistances is placed in a position that is such as not to allow produced heat to be dissipated, so that it diffuses to the adjacent areas and particularly upwards, at the gluing roller.

[0006] In order to overcome this serious drawback, which may cause malfunction or even breakage of mechanical members of the apparatus, glue distributing apparatuses are known that are provided with glue tanks positioned next to the gluing roller and which extend upwards. In this way the heat generated by the tank resistances can be dissipated to the external environment and does not affect, unless marginally, the work area and in particular the roller and the corresponding movement members.

[0007] The tank has a lower portion or chamber provided with an opening through which the glue flows by force of gravity to the gluing roller. The latter partially shuts said opening and, by rotating, transfers and spread the glue on the surfaces of the elements to be joined.

[0008] Within the lower chamber, interposed between the roller and the opening, glue adjusting means is generally provided comprising fixed doctor blades for adjusting the quantity of glue to be spread onto the knurled surface of the gluing roller.

[0009] In particular, these apparatuses can comprise a first doctor blade, called dosing doctor blade, for depositing or spreading an uniform layer of glue of a fixed thickness on the gluing roller, and a second doctor blade, called return or recovery doctor blade, which recovers the exceeding glue on the roller that has not been trans-

ferred to the surface to be glued. The return doctor blade moreover keeps any foreign bodies outside the chamber.

[0010] The doctor blades are arranged parallel to one another at a preset distance, opposite the opening of the lower chamber of the tank in such a way as to form a cavity in which the glue gathers that is taken from the roller.

[0011] Each doctor blade comprises an elongated flat element, provided with an edge abutting on the gluing roller along a generatrix thereof, operating substantially as a "spatula" to spread a uniform layer of glue on said roller.

[0012] Alternatively, each doctor blade may consist of a cylindrical pivot, arranged parallel to the gluing roller and provided with a longitudinal plane that constitutes a flat surface that conveys and spreads the glue on the roller.

[0013] The doctor blades, because of their shape and arrangement, form in the lower chamber of the tank a cavity inside which the rotation of the gluing roller causes the formation of turbulence and vortices in the liquid glue contained therein.

[0014] Such a turbulent flow causes an uneven distribution of the glue on the roller since this glue is distributed in a nonuniform manner along the height of the roller.

[0015] In fact, it has been observed that on a top portion of the roller a quantity of glue is deposited that is less than that which is deposited on the lower part. This causes an irregular gluing since a glue layer with an uneven thickness is applied to surfaces to be glued.

[0016] Turbulent flow and vortices in the liquid glue intensify as rotation speed of gluing roller increases, for example if it is necessary to spread glue on rapidly moving parts, typically in squaring edgebanding machines that machine straight panels in line, with high rectilinear movement speeds. This drawback of known glue distributing apparatuses often forces to reduce a production speed of the machines.

[0017] An object of the invention is to improve known glue distributing apparatuses, in particular for woodworking machines for machining elements of wood or similar materials. Another object is to obtain a glue distributing apparatus that enables a uniform and homogenous distribution of glue on a gluing roller for the entire length thereof.

[0018] In the invention there is provided a glue distributing apparatus comprising roller means for applying a glue to an element to be glued, tank means for containing said glue and provided with an opening for conveying said glue to said roller means, and adjusting means interposed between said roller means and said opening for adjusting a quantity of glue transferred to/from said roller means, **characterised in that** said adjusting means comprises doctor blade means provided with respective cavity means.

[0019] Owing to this aspect of the invention it is possible to obtain a glue distributing apparatus for spreading in a uniform and homogenous manner the glue on the

roller means, for the entire length thereof. The presence of cavities made on the doctor blade means in fact substantially reduces, during the apparatus operation, formation of turbulences and vortices in the liquid glue near the roller means. In this way, the glue can regularly reach all the points of roller means, along the entire length thereof. The apparatus further allows adjusting in a precise and effective manner a glue distribution on surface to be glued, especially a thickness of a glue layer to be applied.

[0020] The invention can be better understood and carried into effect with reference to the attached drawings in which some embodiments of the inventions are shown by way of nonlimiting example, in which:

Figure 1 is a schematic partial section, taken along a longitudinal plane, of the glue distributing apparatus of the invention;

Figure 2 and 3 are schematic partial sections, taken along a plane II-II of Figure 1, showing doctor blade means in respective different working positions;

Figure 4 is a schematic partial section taken along a longitudinal plane, of a version of the apparatus of the invention;

Figures 5 and 6 are schematic partial sections, taken along a plane V-V of Figure 4, showing doctor blade means in respective different working positions and shutting means in an open position;

Figure 7 is a section like the one in Figure 6, wherein shutting means is in a closed position.

[0021] With reference to Figures 1 to 3, there is schematically shown a glue distributing apparatus comprising roller means 2, tank means 3 and adjusting means 4.

[0022] Roller means 2 comprises a rotating roller, of known type, having a rough or knurled external surface 2a for removing, conveying and applying a preset layer of glue to an element 50 to be glued.

[0023] The roller 2 is rotated by suitable actuating means, of known type and not shown in the Figures, and it can be rotate both clockwise and anticlockwise, depending on elements 50 to be glued. For example, the roller 2 rotates clockwise to glue strips or belts in the so-called "softforming" process, whilst it rotates anticlockwise to glue edges of panels or tables to be edgebanded, in the so-called "straight" process. Tank means 3, which contains the glue and is placed next to the roller means 2, extends upwards and is provided with an opening 3a for conveying said glue to the roller means 2. The tank means 3 is further provided with a plurality of electric heating elements 23 that are able to heat and melt uniformly the glue and to maintain fluid the latter.

[0024] The opening 3a of tank means 3 has a height that is almost the same as that of a portion of the roller 2 configured for receiving the glue.

[0025] Adjusting means 4 is interposed between the roller means 2 and the opening 3a for regulating a quantity of glue transferred to the roller 2 for a subsequent

application on an element 50 to be glued. Adjusting means 4 is further configured so as to recover from the roller 2 the exceeding glue, which has not been spread on element 50.

[0026] Adjusting means 4 comprises doctor blade means 5, 6 provided with respective cavity means 5a, 6a. Doctor blade means comprise a first doctor blade 5 and a second doctor blade 6.

[0027] Each doctor blade 5, 6 is an element with a longitudinally elongated shape, for example a pin with an approximately cylindrical section, on which a respective cavity 5a, 6a is made, consisting of an open hollow space that extends longitudinally for about the entire length of the element. The cavity 5a, 6a is for example a straight groove with a U-shaped cross section having a concave bottom wall.

[0028] The two doctor blade 5, 6 are arranged parallel each other and spaced apart from one another in such a way that the respective cavities 5a, 6a are almost face one another to form a volume or space 7 that is shaped for containing the glue.

[0029] It has been find out that such cavities 5a, 6a reduce and limit considerably the formation of turbulences and vortices in the liquid glue during rotation of roller 2. This enables an almost uniform and homogenous distribution of the glue on the whole length of roller 2 to be obtained, regardless of a rotation speed of roller 2.

[0030] Each doctor blade 5, 6 comprises an abutting portion 5b, 6b, configured so as to contact the roller 2, and a sealing portion 5c, 6c suitable for abutting on a respective seat 3b, 3c of tank means 3.

[0031] With reference to Figures 2 and 3, the abutting portion 5b, 6b is, for example, an edge made on an external surface of the doctor blade, whilst the sealing portion 5c, 6c is a portion of said external surface, having a concave shape, complementary to a shape of seat 3b, 3c, for example a portion of cylindrical surface.

[0032] Each doctor blade 5, 6 is rotatably mounted around a respective rotation axis 5d, 6d, so as to be movable between a first working position A and a respective second working position B. The rotation axes 5d, 6d are parallel to one another and also parallel to a rotation shaft 8 of the roller 2.

[0033] In the first working position A, the abutting portion 5b, 6b of the doctor blade 5, 6 substantially abuts on the external surface 2a of the roller 2 in such a way as to adjust the passage of glue to be deposited onto the roller and to uniformly extend said glue onto said outside surface 2a.

[0034] In the second working position B the abutting portion 5b, 6b of doctor blade 5, 6 is spaced from a respective external surface 2a of roller 2 to enable the exceeding glue on the roller 2 to be recovered and at the same time to prevent possible foreign bodies entering the volume 7.

[0035] Driving means, of known type and not shown in the Figures, is provided for rotating the doctor blades 5, 6 between the two working positions.

[0036] The doctor blades 5, 6 can be mounted so as to independently rotate, driven separately by respective driving means.

[0037] Alternatively, the doctor blades 5, 6 can be mounted linked together and connected by suitable interconnecting means, in such a way as to rotate together. Said interconnecting means can be of mechanical type, for example pulley or gear mechanisms, or of electronic type, for example electronic control means of actuating means.

[0038] When the doctor blades 5, 6 are interconnected, a rotation of a doctor blade is matched by a same rotation of the other doctor blade. More specifically and with reference to Figures 2 and 3, when for example the first doctor blade 5 is in the respective first working position A, the second doctor blade 6 is in the respective second working position B. In this case, the apparatus 1 is in a first operating configuration P in which the roller 2 rotates in an anticlockwise direction, for example to apply glue to an edge of a panel 50.

[0039] Rotation of first doctor blade 5 in the respective second working position B coincides with rotation of second doctor blade 6 in the respective first working position A. In this case, the apparatus 1 is in a second operating configuration Q wherein the roller 2 rotates in a clockwise direction, for example to apply glue to a strip or belt 50.

[0040] The doctor blade 5, 6 can also be made as a single body. In this case, the respective rotation axes 5d, 6d are coincident.

[0041] Figures 4 to 7 show a version of the apparatus 1 which comprises shutting means 10, that is movable and interposed between the roller 2 and the opening 3a of the tank means 3 for closing and/or opening said opening 3a.

[0042] In particular, shutting means 10 can be inserted between the adjusting means 4 and said opening 3a.

[0043] Shutting means 10 is movable between a closed position C, in which it shuts said opening 3a to prevent the glue passing from the tank means 3 to the roller 2 (Figure 7), and a complete open position D, in which it opens said opening 3a and enables the glue to pass through (Figures 5, 6).

[0044] In an intermediate position, which is not illustrated in Figures, the shutting means 10 can adjust a glue flow to the roller 2, partially closing the opening 3a.

[0045] Shutting means 10 comprises an elongated element, substantially cylindrical, rotatably mounted on a rotating pin 11.

[0046] Shutting means 10 further has a passage 12 comprising a longitudinal through opening that enables the glue to transit and which has a length that is almost equal to a height of the opening 3a.

[0047] Shutting means 10 is contained in a suitable respective seat 3d made in the tank means 3, inside which it can rotate.

[0048] In this version of the apparatus 1, the adjusting means 4 comprises a couple of doctor blades 15, 16 made of a single body and rotatable around respective

rotation axes 15d, 16d that in this case coincide.

[0049] More precisely, the adjusting means 4 comprises an elongated tubular element 19 that is substantially cylindrical with open section, provided with two facing and opposite portions 15, 16 acting as doctor blades.

[0050] Each doctor blade 15, 16 has a respective abutting portion 15b, 16b, configured so as to abut on the external surface 2a of the roller 2, and a respective sealing portion 15c, 16c configured so as to abut on said respective seat 3d of tank means 3.

[0051] As shown in Figures 5 and 6, it is sufficient to rotate the tubular body 19 of the adjusting means 4 in order to position the two doctor blades 15, 16 at the same time and with precision in the respective working positions. In particular, when the apparatus 1 is in a first operating configuration P, the first doctor blade 15 is in a respective first working position, i.e. substantially abutting on the roller 2 to adjust a glue passage on the roller, and the second doctor blade 16 is in a respective second working position, i.e. spaced from the roller 2 to enable the exceeding glue to be recovered. On the other hand, when the apparatus 1 is in a second operating configuration Q, the first doctor blade 15 is in a respective second working position and the second doctor blade 16 is in a respective first working position.

[0052] The tubular body 19 of the adjusting means 4 has an internal cylindrical cavity 17 into which the shutting means 10 is inserted coaxially.

[0053] There is further provided a through slot 18, made on a wall of said tubular element 19 and facing said abutting edges 15b, 16b. Glue coming from the tank means 3 can pass through the slot 18 to reach roller means 2.

[0054] This version of the distributing apparatus 1 thus comprises adjusting means 4 and shutting means 10 in a very compact structure.

[0055] Adjusting means 4 that comprises two doctor blades 15, 16, that are integral and movable at the same time, allows adjusting and controlling in a simple, rapid and effective manner a distribution of the glue on surfaces to be glue, regardless of a rotation direction of the roller 2.

[0056] At the same time, shutting means 10 can close hermetically the opening 3a, thus preventing glue from reaching the roller 2 and leaking through passages and openings of the external surface 2a of said roller during stop phases of the apparatus.

[0057] Shutting means 10 comprises a couple of recesses 13, 14, made on an internal wall of the passage 12 for an entire extent of the latter.

[0058] Recesses 13, 14 are substantially the same and symmetrically arranged with respect to a longitudinal plane of symmetry S of shutting means 4. In particular, said recesses 13, 14, which have an almost U-shaped section, are arranged so as to form a respective cavity 20 converging on roller means 2.

[0059] By means of recesses 13, 14 it is possible to reduce considerably the formation of turbulences or vortices in the liquid glue during the rotation of roller 2, so

as to obtain an almost uniform and homogenous distribution of glue on the entire length of the roller 2, regardless of speed rotation thereof. In a further version of the apparatus 1 not shown in Figures, respective cavities can be provided on the walls of the tubular body 19 of adjusting means 4 at the doctor blades 15, 16.

Claims

1. Glue distributing apparatus comprising roller means (2) for applying a glue to an element to be glued (50), tank means (3) containing said glue and provided with an opening (3a) for conveying said glue to said roller means (2), and adjusting means (4) interposed between said roller means (2) and said opening (3a) for adjusting a quantity of glue transferred to/from said roller means (2), **characterised in that** said adjusting means (4) comprises doctor blade means (5, 6) provided with respective cavity means (5a, 6a). 5
2. Apparatus according to claim 1, wherein said doctor blade means (5, 6) is mounted movable in such a way as to be movable between a respective first working position (A), for regulating a passage of glue to be spread on said roller means (2), and a respective second working position (B), for recovering exceeding glue from said roller means (2). 10
3. Apparatus according to claim 2, wherein said doctor blade means (5, 6) is rotatably mounted around a respective rotation axis (5d, 6d). 15
4. Apparatus according to claim 3, comprising driving means for moving said doctor blade means (5, 6). 20
5. Apparatus according to any preceding claim, wherein said doctor blades means (5, 6) comprises two doctor blades, each provided with a respective cavity (5a, 6a). 25
6. Apparatus according to claim 5, wherein said doctor blades (5, 6) are made in single body. 30
7. Apparatus according to claim 5, comprising means for interconnecting said doctor blade means (5, 6). 35
8. Apparatus according to any one of claims 5 to 7, wherein said doctor blades (5, 6) are mounted in such a way that when a doctor blade (5, 6) is in the first working position (A) the remaining doctor blade (6, 5) is in the second working position (B) and vice versa. 40
9. Apparatus according to any one of claims 5 to 8, wherein each doctor blade (5, 6) comprises an elongated element, in particular a shaped pin. 45
10. Apparatus according to any one of claims 5 to 9, wherein each doctor blade (5, 6) comprises an abutting portion (5b, 6b) suitable for abutting on said roller means (2). 50
11. Apparatus according to any one of claims 5 to 10, wherein each doctor blade (5, 6) comprises an external portion (5c, 6c) suitable for abutting on a respective seat (3b, 3c) of tank means (3). 55
12. Apparatus according to any one of claims 5 to 11, wherein each cavity (5a, 6a) extends longitudinally almost along a length of the respective doctor blade (5, 6).
13. Apparatus according to one of claims 5 to 12, wherein each cavity (5a, 6a) has a substantially U-shaped section.
14. Apparatus according to any one of claims 5 to 13, wherein said doctor blades (5, 6) are mounted in such a way that said respective cavities (5a, 6a) almost face one another and are substantially turned towards said roller means (2).
15. Apparatus according to any one of claims 5 to 14, wherein said doctor blades (5, 6) are substantially parallel.
16. Apparatus according to claim 15, wherein said doctor blades (5, 6) are substantially parallel to said roller means (2).

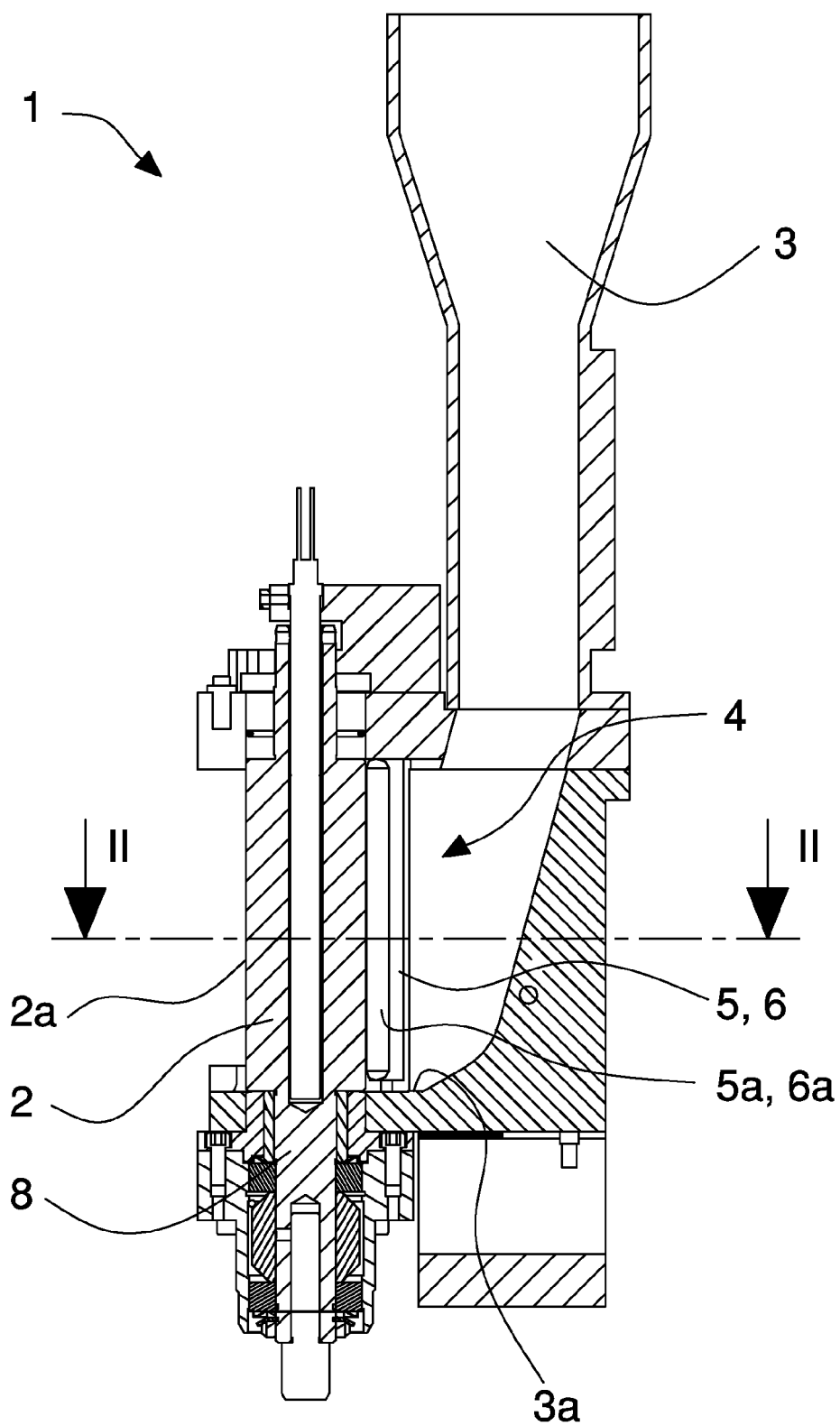


Fig. 1

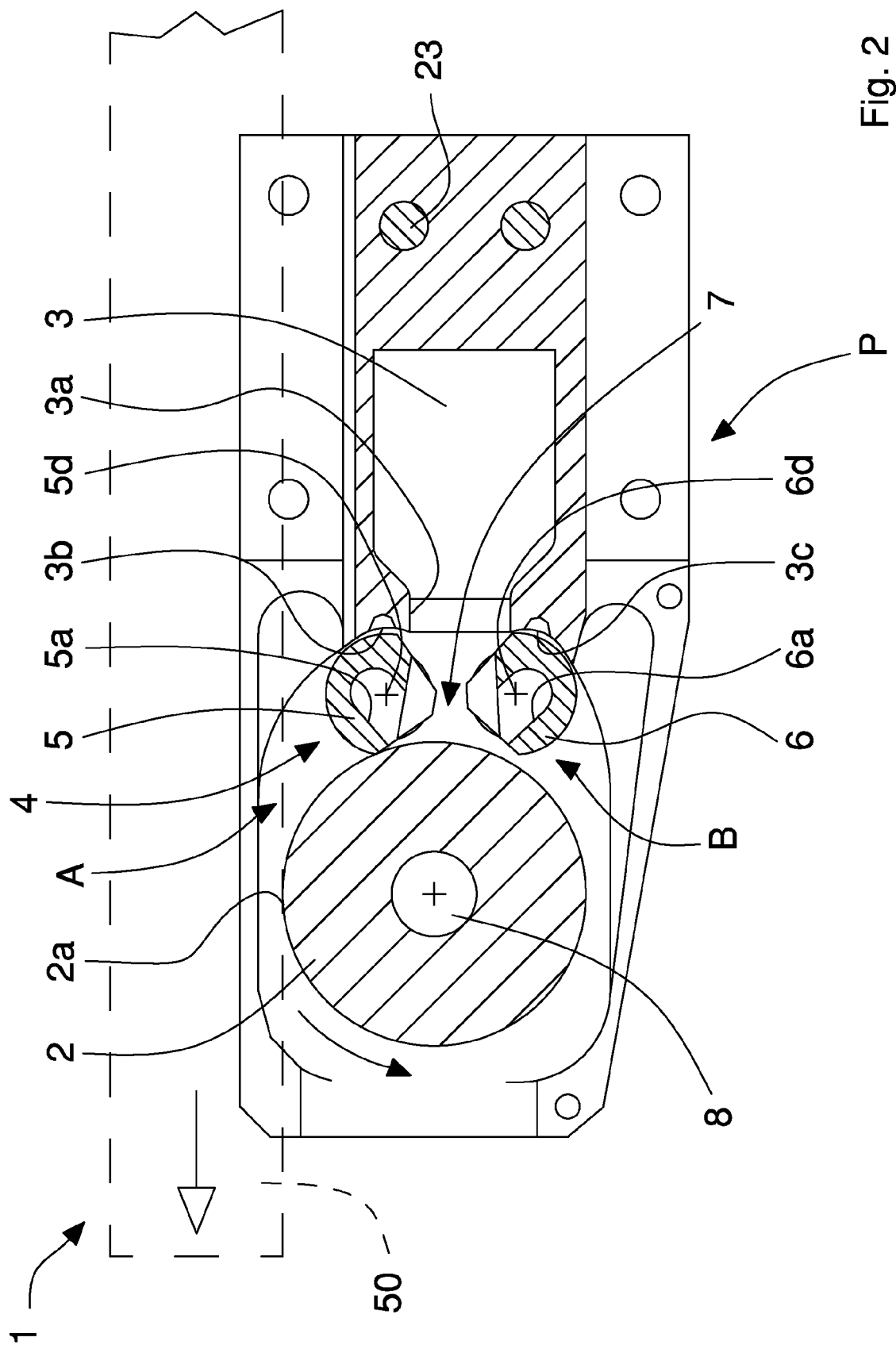


Fig. 2

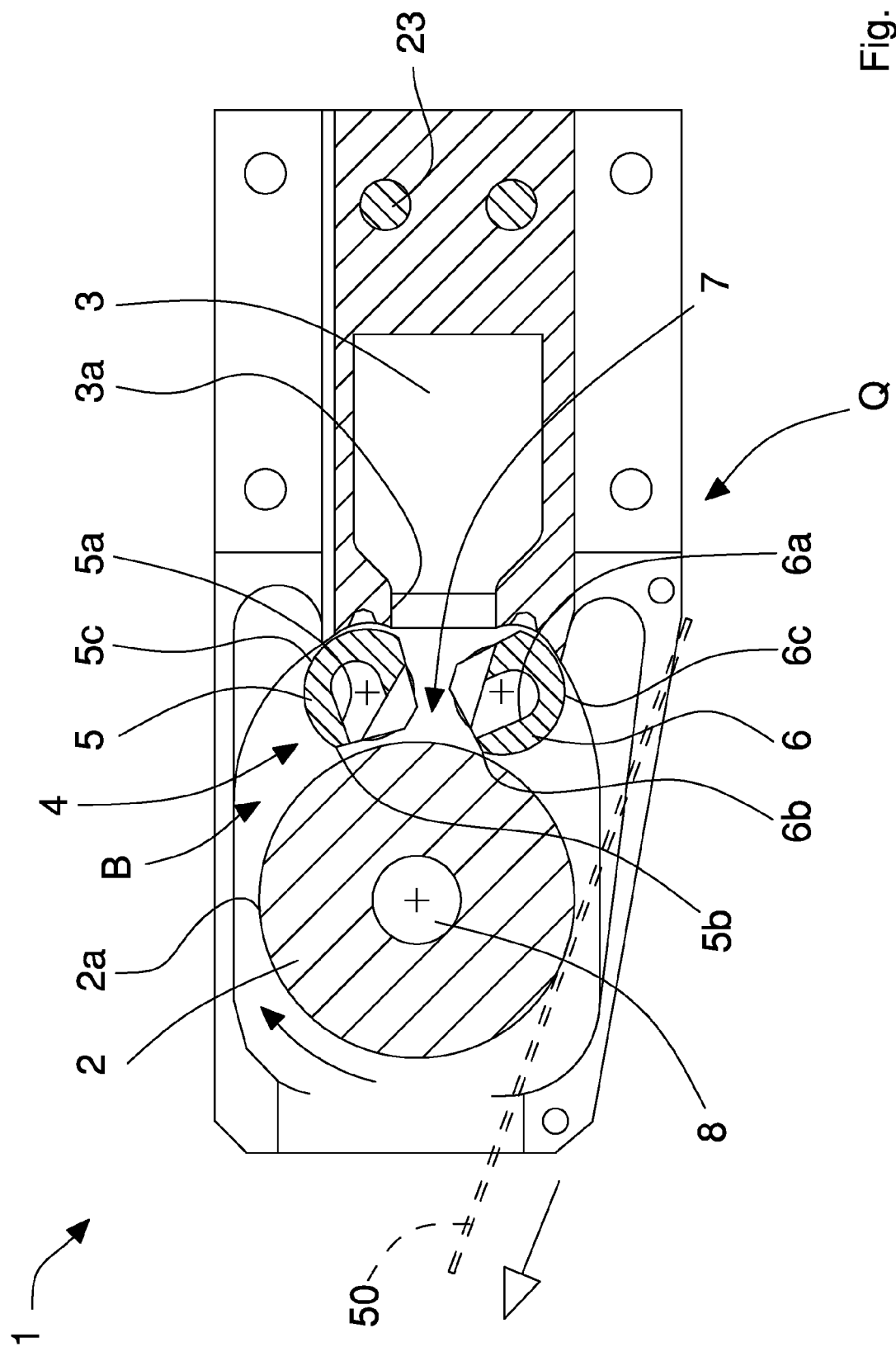
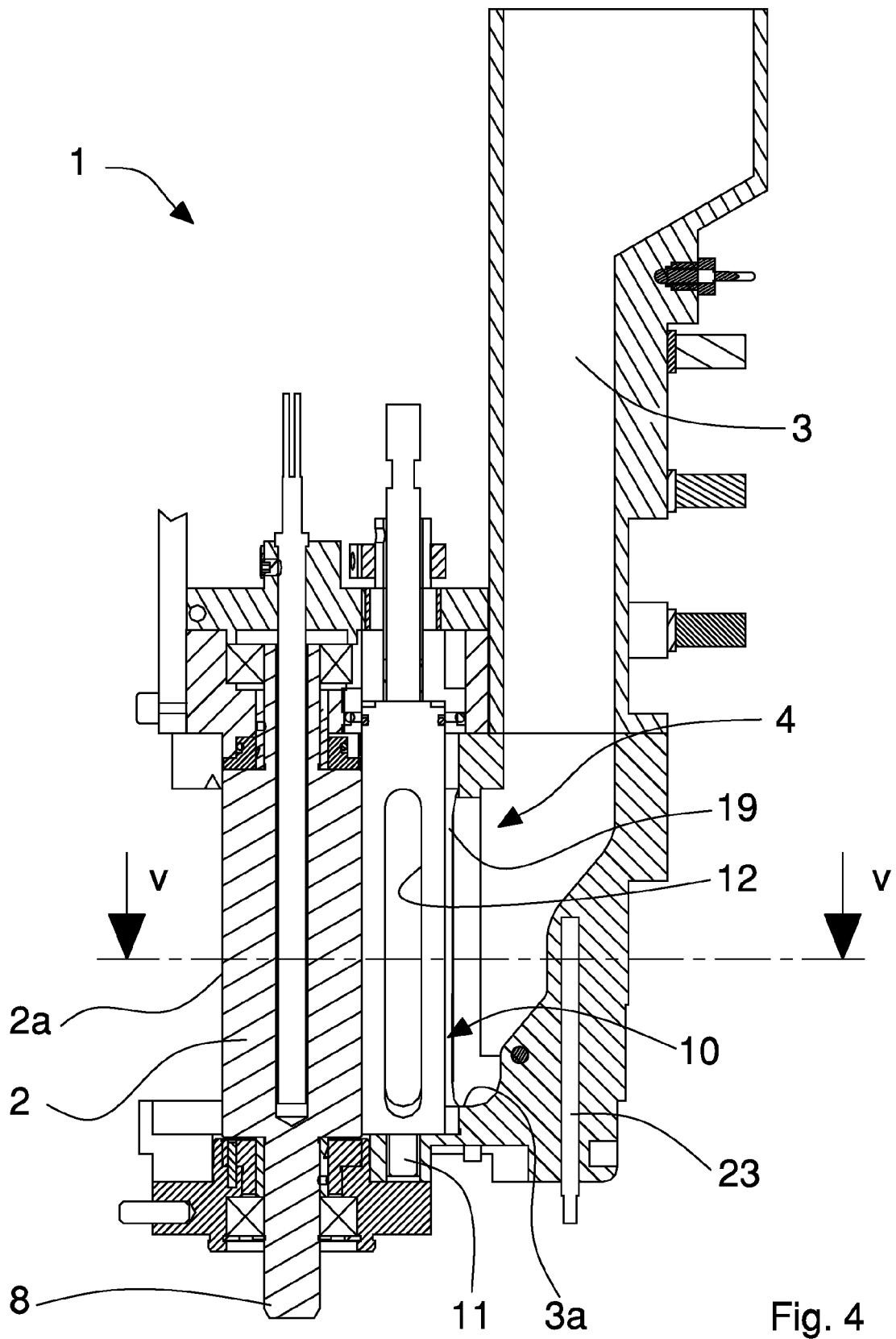


Fig. 3



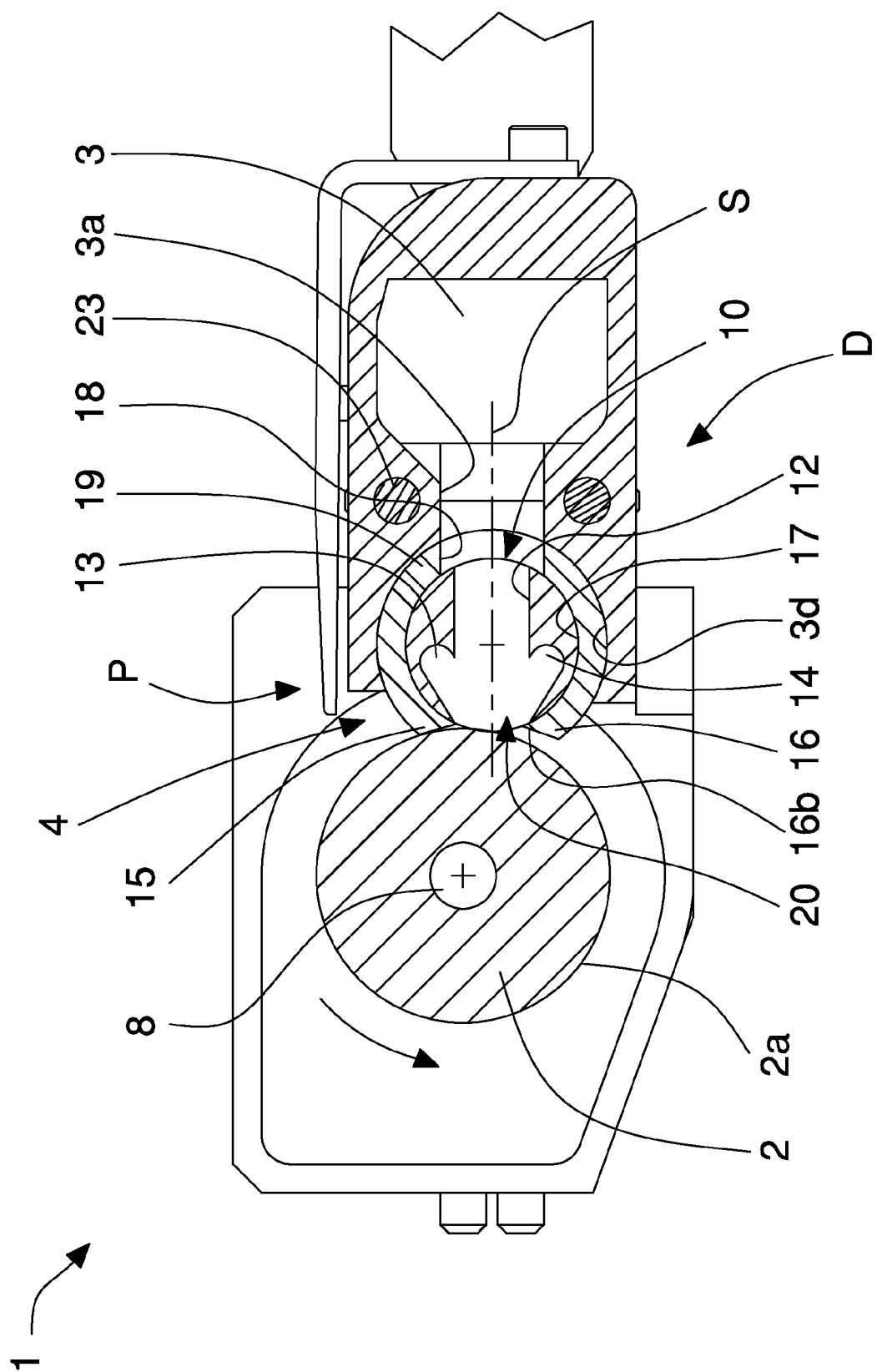


Fig. 5

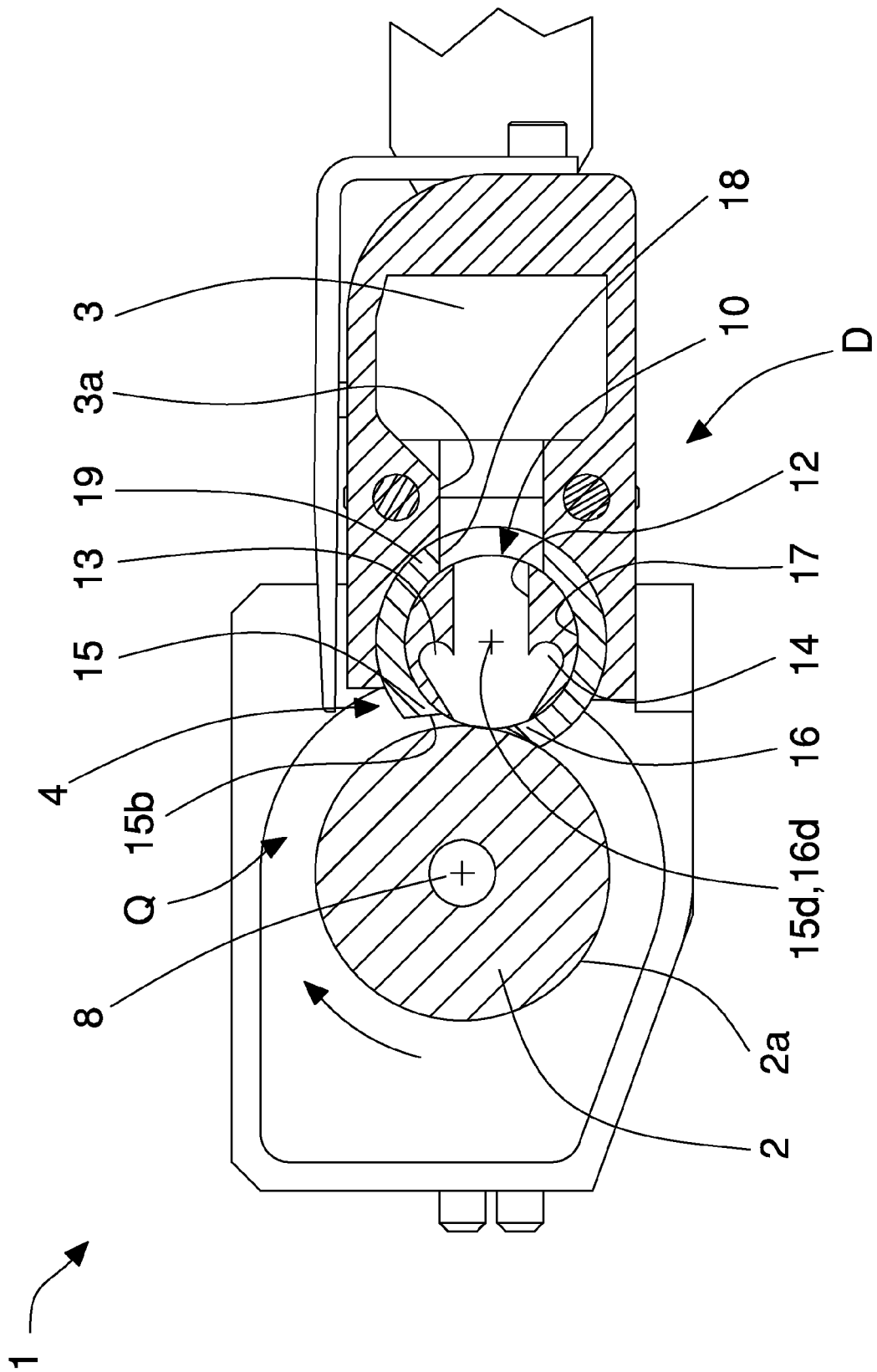


Fig. 6

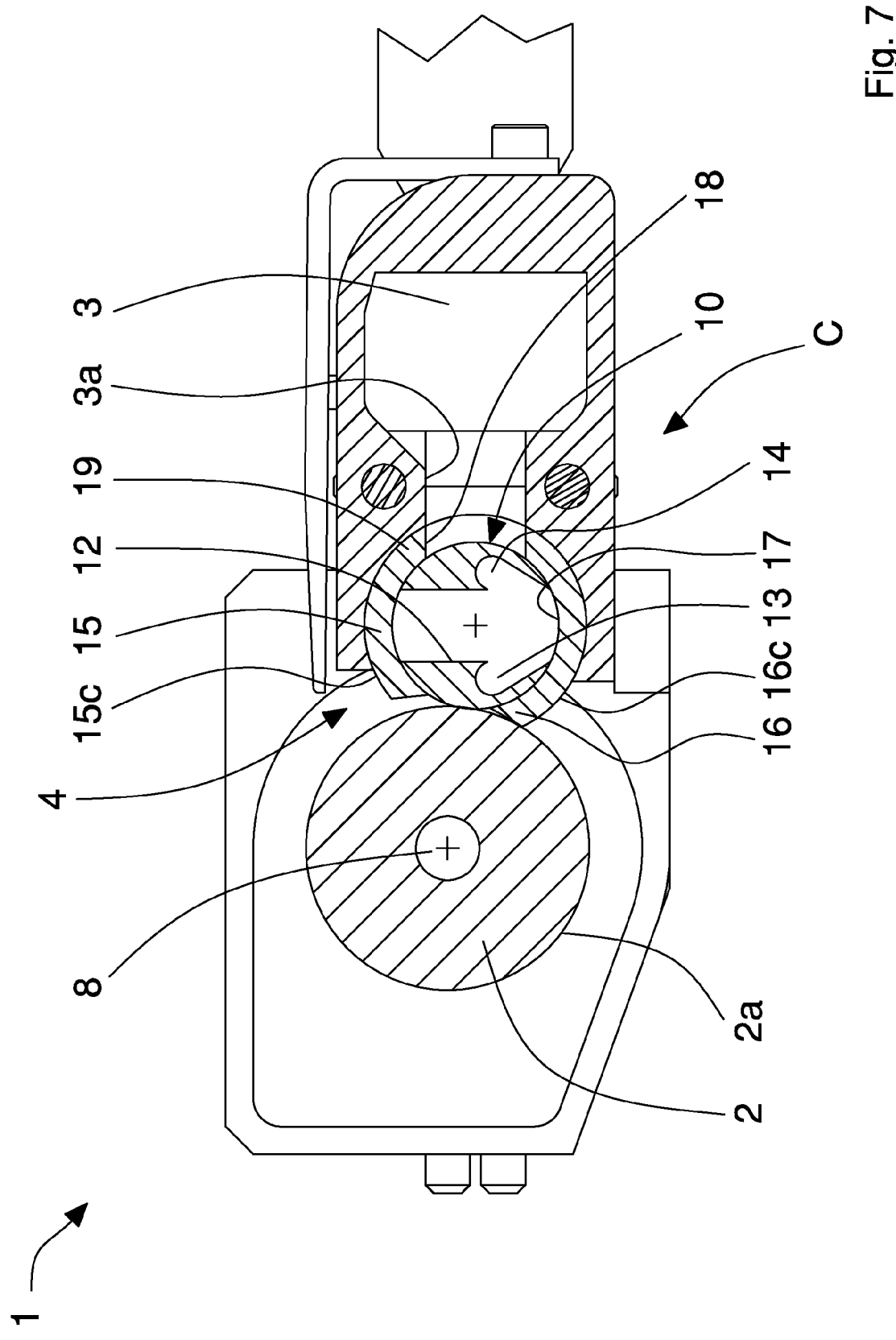


Fig. 7



EUROPEAN SEARCH REPORT

Application Number
EP 09 15 8805

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	DE 18 86 392 U (HENKEL & CIE GMBH [DE]) 23 January 1964 (1964-01-23) * figure 1 *	1-16	TECHNICAL FIELDS SEARCHED (IPC) B27G B05C B27D B42C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 June 2009	Examiner Meritano, Luciano
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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