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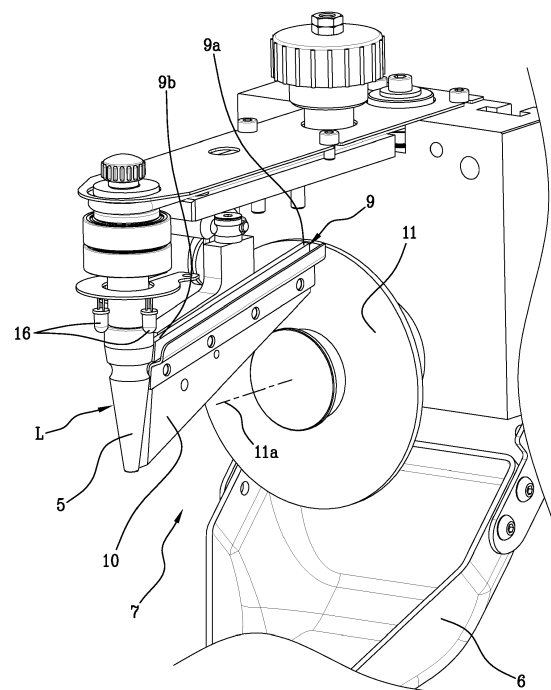
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(54) **MACHINE FOR COLOURING MISCELLANEOUS ARTICLES OF LEATHER AND IMITATION LEATHER**

(57) A machine for colouring miscellaneous articles of leather and leatherette comprises: a supporting frame (3) and a colouring unit (2), supported by the frame (3) and operated by a driving system (4), comprising a colouring head (5), adapted for applying a layer of liquid colour directly in contact with the article being processed, a tray (6) collecting the colour adapted for containing the colour to be deposited in the article, a device (7) for transporting and dosing the colour on the colouring head. The device (7) for transporting and dosing the colour comprises a colour feed channel (9) having a doctor blade (10), coupled to the colouring head (5), placed immediately below the feed channel (9).

Fig.7



Description

[0001] The present invention relates to a machine for colouring miscellaneous articles of leather and leatherette.

[0002] In particular, the present invention finds application in the field of colouring of the side edge of various articles, for example small leather items such as details for bags, saddlery or edges of shoe soles, shoe uppers, for colouring briefcases, purses and wallets, watch straps and irregularly shaped objects made of leather or leatherette, and having indentations or elbows to be coloured.

[0003] Generally, leather or leatherette products undergo a colouring process, and finally a drying process to fix the colour.

[0004] The machines for colouring similar articles can be in line systems, comprising consecutive processing stations, or single machines with which the operator must interact directly.

[0005] In other words, for the colouring of small products or details of leather or leatherette, it is preferable to use machines comprising a colouring unit mounted on a body containing a driving engine.

[0006] The colouring unit comprises a colouring roller having a cylindrical shape, rotatable about a preferably vertical axis. The colouring roller, properly fed with liquid colour, spreads a uniform layer of dye on the article which the operator approaches.

[0007] Under the colouring roller, there is a tray collecting the collecting the colour, fixed to the colouring unit by screws.

[0008] In fact, the colour is poured directly inside the tray and a colour transport device, such as a screw conveyor, a suction pump system connected to a diffuser nozzle or a pad (as already known in patent WO 99/57327), draws the colour directly from the tray to pour it on the colouring roller. The colour is distributed on the surface of the colouring roller, falling by gravity from above or sprayed through a nozzle directly to the whole surface of the roller.

[0009] The excess liquid, which is not transferred on the product, drips from the roller and is recovered into the appropriate tray.

[0010] A scraper or doctor blade evenly distributes the colour on the entire surface of the colouring roller to avoid excessive colour deposits in discrete points of the product.

[0011] The skill and experience of the operator, who transfers the product appropriately, contribute to an optimal distribution of the liquid colour on the product surface and to avoid unsightly accumulations.

[0012] In known machines, in fact, the doctor blade and the transport device are placed at the sides of the roller, or one behind and the other laterally, creating in each case a certain encumbrance around the colouring head. Therefore, despite the operator's ability, ease of interaction with the machine is limited by the presence of the doctor blade and the device for transporting the

colour, which reduce the area available for the operator to manoeuvre the product.

[0013] Moreover, the doctor blade is generally made with flat bristles, like the head of a brush. Due to this, the realization of scrapers suitable to be coupled to rollers having special shapes is difficult.

[0014] After the colouring process, finally, it is necessary to wash thoroughly all the parts that have come into contact with the colour, so that they can be used later also with different colours and avoiding colour changes with alteration of pigmentation.

[0015] Therefore it is necessary to clean also the doctor blade and the device for transporting the colour. The more pieces are present, the greater the time required for removing the colouring unit and washing each component. What has just been described makes clear the need to provide a machine for colouring miscellaneous articles of leather and leatherette that is able to overcome the above-described drawbacks.

[0016] The object of the present invention is to provide a machine for colouring miscellaneous articles of leather and leatherette which overcomes the drawbacks of the described prior art.

[0017] Another object of the present invention is to present a machine for colouring miscellaneous articles of leather and leatherette which has a large working area free of components that may interfere with the colouring operations and hinder the free movement of the product by the operator.

[0018] A further object of the present invention is to provide a machine for colouring miscellaneous articles of leather and leatherette which avoids long downtime.

[0019] Lastly, an object of the present invention is to propose a machine for colouring miscellaneous articles of leather and leatherette that has a limited number of components to be washed at the end of the colouring process.

[0020] These and other objects are substantially achieved by a machine for colouring miscellaneous articles of leather and leatherette as described in one or more of the appended claims.

[0021] Further features and advantages will become clearer from the detailed description of a preferred and non-limiting embodiment of a machine for colouring miscellaneous articles of leather and leatherette according to the present invention.

[0022] This description is provided with reference to the accompanying figures, also provided only by way of a non-limiting example, wherein:

- Figure 1 is a perspective view of a machine for colouring miscellaneous articles of leather and leatherette as described and claimed in the present invention;
- Figure 2a is a perspective view of a colouring unit, belonging to the machine illustrated in Figure 1, represented in non-operative position and according to a first configuration;

- Figure 2b is a perspective view of a colouring unit, belonging to the machine illustrated in Figure 1, represented in non-operative position and according to a second configuration;
- Figure 3 shows a perspective view of a detail of the machine object of the present invention, specifically the magnification of the colouring unit;
- Figure 4 shows a rear view of the machine object of the present invention with some removed parts to be able to view the otherwise hidden interior;
- Figures 5 and 6 show the machine object of the present invention with the colouring unit in two different positions;
- Figure 7 shows a magnification of a detail of the machine object of the present invention.

[0023] The numeral 1 globally indicates a machine for colouring miscellaneous articles of leather and leatherette.

[0024] The machine 1 for colouring miscellaneous articles of leather and leatherette comprises a colouring unit 2 and a supporting frame 3 for the colouring unit 2.

[0025] The supporting frame 3 also acts as a housing for a driving system 4, for example an engine adapted to actuate the colouring unit 2.

[0026] The colouring unit 2 comprises a colouring head 5, adapted to apply by contact a liquid layer of colour directly on the detail to be treated.

[0027] Below the colouring head 5, the unit 2 comprises a tray 6 for collecting colour within which the colour used for the colouring of the product is contained.

[0028] The tray 6 serves both to contain the colour that is to be transferred on the colouring head 5, and to collect the colour that falls from the colouring head 5 during the colouring of the article to be treated.

[0029] The colour is transferred from the tray 6 to the colouring head 5 through a device 7 for transporting and dosing the colour, which will be described later.

[0030] The colouring head 5 is a roller, rotatable about a preferably vertical axis of rotation 5a that coincides with its own axis of symmetry.

[0031] The roller 5 has a conical or frusto-conical shape. Advantageously, the tip 51 or, in case of frusto-conical shape, the smaller base 52 of the roller can be turned downwards. Consequently, in both cases, the larger base 53 is facing upward. The roller 5 may have an outer side surface 5b having different geometries.

[0032] The outer side surface 5b is obtained by rotating a right-angled triangle about one of the cathetuses. Depending on whether the hypotenuse is rectilinear or has a concave or convex shape, it is possible to have different geometries of the outer side surface 5b, while always maintaining the conical or frusto-conical geometry.

[0033] The conical or frusto-conical shape with the tip 51 or the smaller base 52 facing downwards preferably improves the visibility of the working area L, in that the source of light that comes from above does not create shadow zones.

[0034] Advantageously, the lighting is represented by an illumination source 16 placed vertically on the working area L with a diffusion that completely surrounds the colouring roller 5. Preferably, a plurality of LEDs positioned around the perimeter of the colouring roller are used. The layout and the type of lighting enhance the ergonomic aspect for the operator.

[0035] The tip 51 or the smaller base 52 of the colouring roller 5 are completely contained within the tray 6 for collecting colour.

[0036] The tray 6 for collecting colour is movable relative to the colouring head 5, in such a way as to be easily moved away from the latter in order to allow emptying.

[0037] The tray 6 can be vertically translatable or rotatable, in both cases towards or away with respect to the colouring roller 5.

[0038] In the appended figures, only the latter configuration was represented, without any intention to exclude also the first solution with a translatable tray. As can be seen in Figures 2 and 3, the tray 6 for collecting colour has a side 6a hinged along a horizontal axis 3a parallel to a front wall 31 of the frame 3, to which the colouring unit 2 is connected.

[0039] The side 6a around which the tray 6 is pivoted is the rear side of the tray and is adjacent to the front wall 31 of the frame 3.

[0040] The tray 6 is movable rotatably with respect to such horizontal axis 3a between a working position (Figures 1 and 5) in correspondence of which it is arranged horizontally and contains the colouring roller 5, and an emptying position (Figures 2 and 6) in correspondence of which it is rotated about the horizontal axis 3 of hinging and is inclined downwards, away from the colouring roller 5. The arrow F in Figure 6 illustrates the direction of rotation.

[0041] Advantageously, the tray 6 may present in the front, in the opposite position to the hinging side 6a, 6b, a spout in such a way as to create a guide to facilitate the discharge of the residual colour when the tray is in the emptying position.

[0042] The rotation of the tray and the front spout part 6b make the emptying of the colouring liquid at the end of work both quick and easy. Advantageously, the colouring unit 2 can comprise a basin 8, preferably disposable and insertable within the tray 6.

[0043] The basin 8 is supported inside the tray 6 without particular constraints, in such a way as to be easily removed at the end of work.

[0044] The basin 8 has substantially the same internal shape of the tray 6 with which it is coupled.

[0045] The colour can be physically collected inside the tray 6 or inside the basin 8, so as to leave the tray 6 clean. In this case, there is a significant improvement in terms of cleanliness and greater speed to perform the washing operations at the end of the job, or to change the type of liquid. The presence of the basin 8 prevents the tray 6 from being affected by the colour, so as to remain clean and to avoid having to disassemble and

wash it.

[0046] The basin 8 with the residual colour can be easily removed from the tray 6 and washed, if required, or thrown away.

[0047] The liquid colour is taken from the tray 6 or from the basin 8 to the colouring head or roller 5 by the mentioned device 7 for transporting and dosing.

[0048] Such a device 7 for transporting and dosing the colour comprises a colour feed channel 9 inside which the liquid colour flows.

[0049] The feed channel 9 is placed behind the roller 5, in the opposite position to the working area L at which there is contact between the roller 5 and the article to be coloured. Advantageously, the feed channel 9 comprises a first end 9a and a second end 9b, opposite to the first and positioned at the top, then close to the larger base 53 of the colouring roller 5. The feed channel 9 is disposed almost horizontally, with a slight downward inclination, so that the liquid colour coming from the first end 9a, placed higher, flows by gravity towards the second end 9b, placed lower.

[0050] Once arrived on the top 53 of the conical or frusto-conical roller 5, the colour always flows downwards by gravity. The rotation of the roller 5 around its vertical axis of rotation 5a causes the complete fouling of the entire outer side surface 5b of the roller 5.

[0051] Advantageously, the device 7 for transporting and dosing the colour also comprises a scraper or doctor blade 10.

[0052] The doctor blade 10 is positioned below the feed channel 9 and is coupled to the colouring roller 5 so as to follow its side profile.

[0053] The doctor blade 10, in fact, serves to dose the liquid colour on the surface of the roller 5: cooperating with the rotation of the roller 5 about its axis 5a, the doctor blade 10 distributes the colour uniformly over the entire outer side surface 5b of the colouring roller 5 and avoids localized excesses of colour.

[0054] The doctor blade 10 is preferably made of hard but flexible plastic material which functions as a spatula.

[0055] The doctor blade 10 is positioned immediately below the feed channel 9, occupying in projection, on a horizontal plane, the same rectilinear space of the feed channel 9.

[0056] The doctor blade 10 and the feed channel 9 have reduced size and volume: in fact, they are contained in the same component placed in line just behind the roller 5, in the opposite position to the working area L inside which contact between the roller and the article made of leather or leatherette to be coloured occurs.

[0057] In this way there is no interference between this component and the working area L, which remains completely free to give the operator the maximum freedom of movement of the product during the colouring step. The device 7 for transporting and dosing the colour also comprises a transport element 11 adapted to remove the colour from the tray 6 or from the basin 8 to convey it to the colour feed channel 9.

[0058] In particular, the transport element 11 is a wheel or disc, rotatable about a horizontal axis 11a, that draws the colour from the tray 6 or from the basin 8 and brings it at the top of the colour feed channel 9, pouring it in correspondence of the first end 9a of the feed channel 9. Colour transport takes place simply by contact. Advantageously, the device 7 for transporting and dosing the colour presents a system for fixing and removing of the rapid type, for example magnetic. Specifically, the disc 11 can be maintained in position by a magnetic coupling system which allows a quick removal as well as a smooth engagement. Also the feed channel 9 can be placed in operative position by means of a fixing and removal system of the rapid type.

[0059] Advantageously, the feed channel 9 may be formed integrally with the doctor blade 10 or may be applied on the latter or, vice versa, the doctor blade 10 may be applied on the feed channel 9.

[0060] In the first case, that is, integrally made doctor blade 10 and feed channel 9, the doctor blade may define a side edge of the feed channel 9. In the second case, it can be placed also at a distance from the channel 10. It is still preferable that the space occupied by the feed channel 9 and doctor blade 10 unit, in both possible configurations, is less than 18% of the circumference of the colouring head 5.

[0061] In this way, the working area, clear for the operator, is very wide, without having structural components scattered around the same colouring head 5. The transport element 11 is also placed behind the roller 5, and in particular behind the feed channel 9, so as not to hinder any operational step. Advantageously, the transport element 11 is symmetrical with respect to the longitudinal axis of the feed channel 9 and placed behind the latter.

[0062] Therefore, the whole device 7 for transporting and dosing has a very compact appearance that groups together in line the feed channel 9 and the doctor blade 10 in a single component. Moreover the compactness of the device 7 for transporting and dosing is also given by the position of the transport element 11, symmetrical with respect to the feed channel 9 and placed behind the latter.

[0063] Altogether, the device 7 for transporting and dosing occupies an optimal position within the colouring unit 2 relative to the working area L, placed in front of the roller, since it is placed exactly on the opposite side with respect to the axis 5a of the roller 5, in the rear part of the roller. The doctor blade 10, the feed channel 9 and the transport element 11 are in a position opposite to the contact zone between the roller 5 and the product to be coloured, so as not to hinder the movement of the product around the roller 5.

[0064] The colours used are water-based, thus very sensitive to the ambient temperature and to the degree of humidity.

[0065] To allow the use of the machine even in very hot areas, a protective screen 13 applicable to the sides of the colouring roller 5 is provided, to leave uncovered

only the working area L.

[0066] In this way, the colour inside the tray 6 is protected from dust or any other foreign body, in addition to being less subject to evaporation phenomena. Advantageously, the temperature control and the protection provided by the protective screen 13 also prevent the formation of a thickened colour film on the surface of the colour within the same tray 6.

[0067] The formation of this film is very detrimental to the quality of the colouring because it changes the percentage of concentration of colour compared to water and can generate lumps in the colour, if crushed, with consequent problems of quality and appearance of colour application on the product.

[0068] All this requires a downtime for colour cleaning.

[0069] The protective screen 13 is removable to be able to freely enter the colouring unit 2. It can be made of plastic material, preferably transparent, to be able to constantly monitor the inside of the colouring unit 2.

[0070] The protective screen 13 protects the colour avoiding unnecessary waste and limiting its evaporation so as to significantly reduce the downtime for the recovery of the liquid during processing.

[0071] During the processing step, the detail to be coloured is moved by the operator's hands and placed in front of the machine.

[0072] The height of the colouring unit 2 compared to the operator is therefore an important factor for the ergonomics of the machine.

[0073] In known machines, the colouring unit is at a fixed and invariable height. This forces the operator to find improvised solutions to bring the colouring unit 2 to its height, or vice versa.

[0074] The colouring machine 1 object of the present invention is able to solve this drawback, by providing a colouring unit 2 that can be adjusted in height.

[0075] The colouring unit 2 is slidably constrained to the supporting frame 3, to be able to be moved vertically at will, until the optimal height is reached for the operator who at that time must interact with the machine 1.

[0076] The frame 3 has, on its front wall 31, a linear sled 14 mounted in vertical position. The colouring unit 2 can slide on this sled 14, so as to regulate the height position of the unit 2 with respect to the front wall 31 of the frame 3.

[0077] Locking systems, not illustrated, are provided, which allow to fix the colouring unit at the established height.

[0078] The colouring unit 2 is connected to the power supply engine 4 through a plurality of components 15, such as return cylinders, tensioning rollers and a drive belt, which ensure the constant contact with the same driving engine 4, at the same time allowing the vertical translation along the sled 14.

[0079] The colouring unit 2 is completely dismantled for routine maintenance and a quick wash.

[0080] The invention allows to achieve the intended purposes in addition to ensuring enormous advantages.

[0081] The compactness of the device for colour transport and dosing allows to place the device in a colouring unit in which it does not interfere with the operator.

[0082] The device for transport and dosing is placed behind the roller, leaving the working area completely free. These components do not even interfere with the diffuse light coming from above, avoiding the formation of shadow zones around the roller.

[0083] The compactness of the device for transport and dosing also limits the number of components to be washed. In the prior art machines, in fact, the feed system and the doctor blade are separate elements. The simplicity of the device for transport and dosing also makes its cleaning and maintenance very simple.

[0084] Finally, downtimes are limited.

[0085] The material with which the doctor blade is made simplifies the realization of the same according to different geometries that best fit the profile of the colouring roller.

Claims

1. Machine for colouring miscellaneous articles of leather and leatherette comprising:

- a supporting frame (3);
- a colouring unit (2), supported by said frame (3) and comprising
- a colouring head (5) adapted for applying a layer of liquid colour directly in contact with the article being processed,
- a tray (6) collecting the colour adapted for containing the colour to be deposited in the article,
- a device (7) for transporting and dosing the colour on said colouring head,
- **characterized in that** said transport device (7) for transporting and dosing the colour comprises a colour feed channel (9) having a doctor blade (10), coupled to said colouring head (5), placed immediately below said feed channel (9).

2. Machine according to the preceding claim, **characterized in that** the space occupied by the feed channel (9) and the doctor blade (10) is less than 18% of the circumference of the colouring head (5).

3. Machine according to the previous claim, **characterized in that** said device (7) for transporting and dosing the colour comprises a transport element (11) suitable to remove the colour from the tray (6) and to deliver it to the colour feed channel (9).

4. Machine according to the previous claim, **characterized in that** said transport element (11) is a wheel, rotatable around a horizontal axis (11 a), that draws the colour from the tray (6) and brings it at the top of the colour feed channel (9).

5. Machine according to the previous claim, **characterized in that** said doctor blade (10) follows the side profile of said colouring head (5) such that to uniformly deliver the dyeing liquid on the entire outer side surface (5b) of the colouring head and to remove the possible excess liquid colour. 5
6. Machine according to one of the preceding claims, **characterized in that** said feed channel (9) is made in one piece with said doctor blade (10). 10
7. Machine according to one of the preceding claims, **characterized in that** said doctor blade (10) is preferably made of hard but flexible plastic material which functions as a spatula. 15
8. Machine according to one of the previous claims, **characterized in that** said colouring head (5) is a conical or frusto-conical shaped roller having an axis of symmetry coincident with an axis of rotation (5a), preferably placed in a vertical position. 20
9. Machine according to one of the preceding claims, **characterized in that** said colouring head (5) with a conical or frusto-conical shape has a larger base (53) facing upwards and a tip (51) or a smaller base (52) contained within said tray (6) collecting the the colour. 25
10. Machine according to one of the preceding claims, **characterized in that** said tray (6) collecting the the colour is hinged along a horizontal axis (3a) parallel to one front wall (31) of said supporting frame (3); said tray (6) being movable between a working position at which it is arranged horizontally and contains the colouring head (5), and an emptying position at which it is rotated around the hinging horizontal axis (3a) and tilted downwards, away from the colouring head (5). 30
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11. Machine according to the preceding claim, **characterized in that** said tray (6) has, at the portion that couples with the colouring head (5), a nozzle (6b) in order to facilitate the emission of colour residue when the tray is in the emptying position. 45
12. Machine according to the preceding claim, **characterized in that** said tray (6) comprises a basin (8) insertable therein. 50
13. Machine according to one of the previous claims, **characterized in that** it comprises a protective screen (13) applicable to the sides of the colouring head (5) in order to protect the colour in the tray (6) and to limit its evaporation. 55
14. Machine according to any one of the preceding claims, **characterized in that** said colouring unit (2) is slidably constrained to said supporting frame (3).
15. Machine according to the preceding claim, **characterized in that** said colouring unit (2) is mounted on a linear sled (14) mounted in vertical position on said supporting frame (3), so that said colouring unit (2) can be adjusted for height.

Fig.1

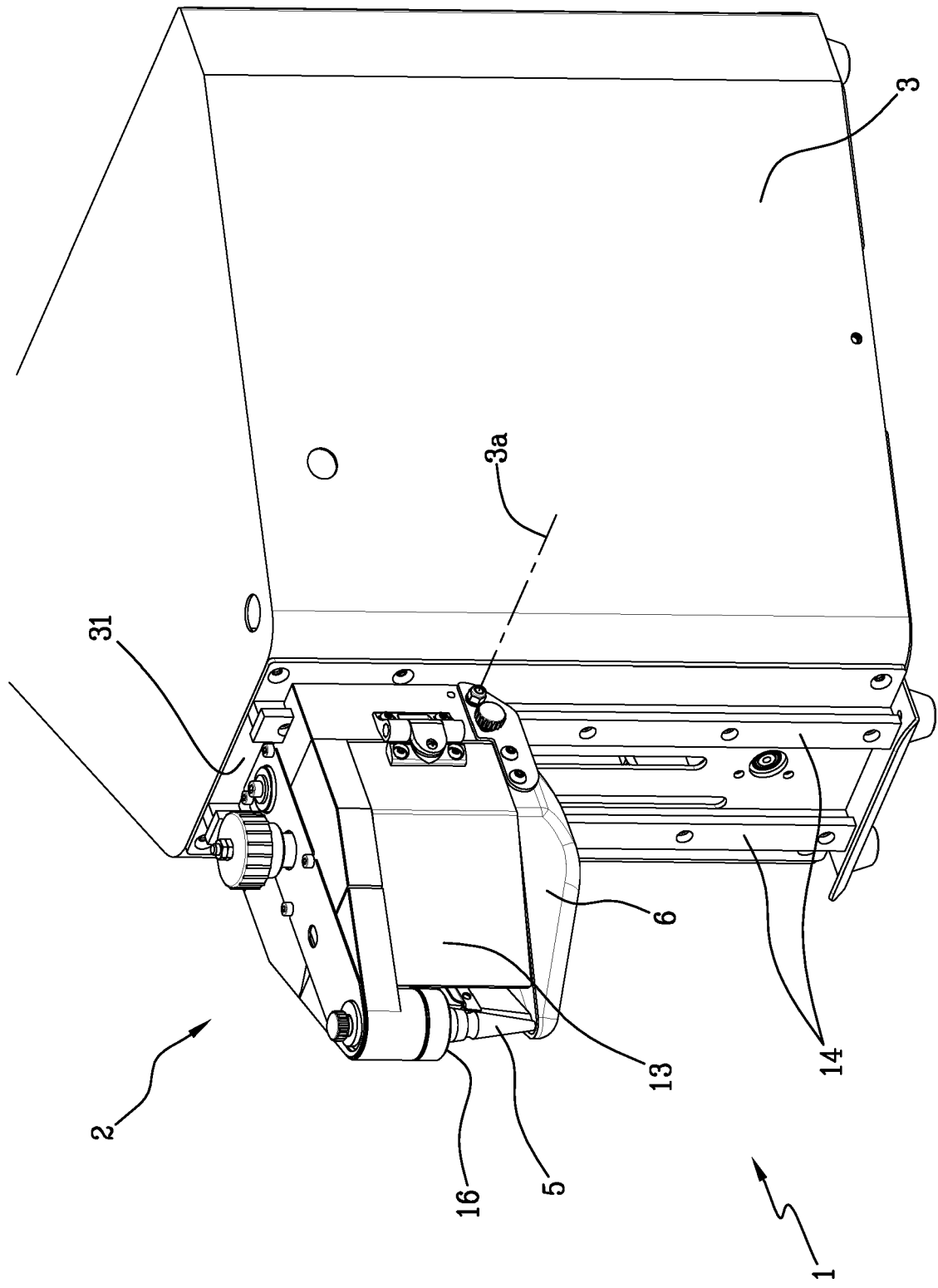


Fig.2a

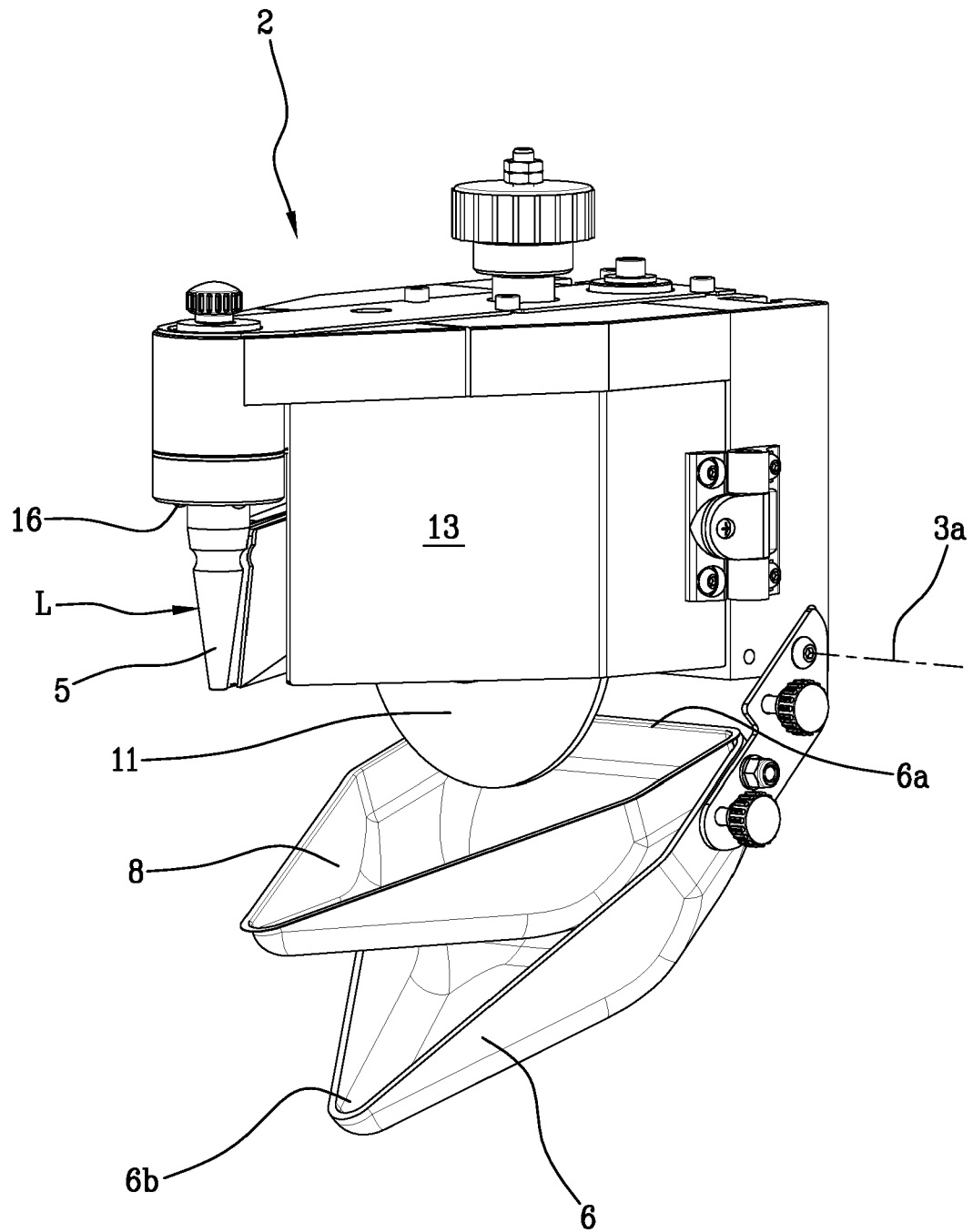


Fig.2b

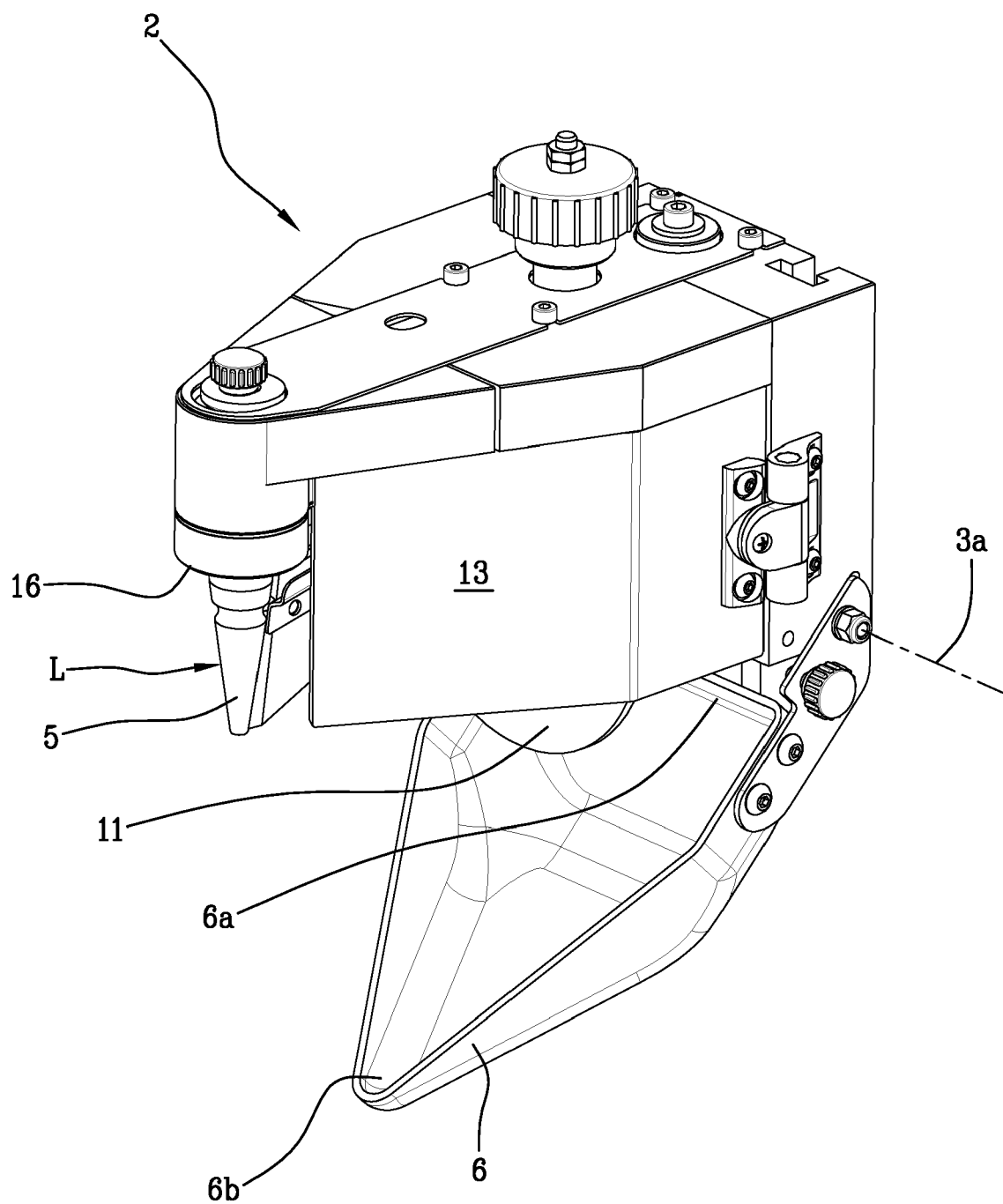


Fig.3

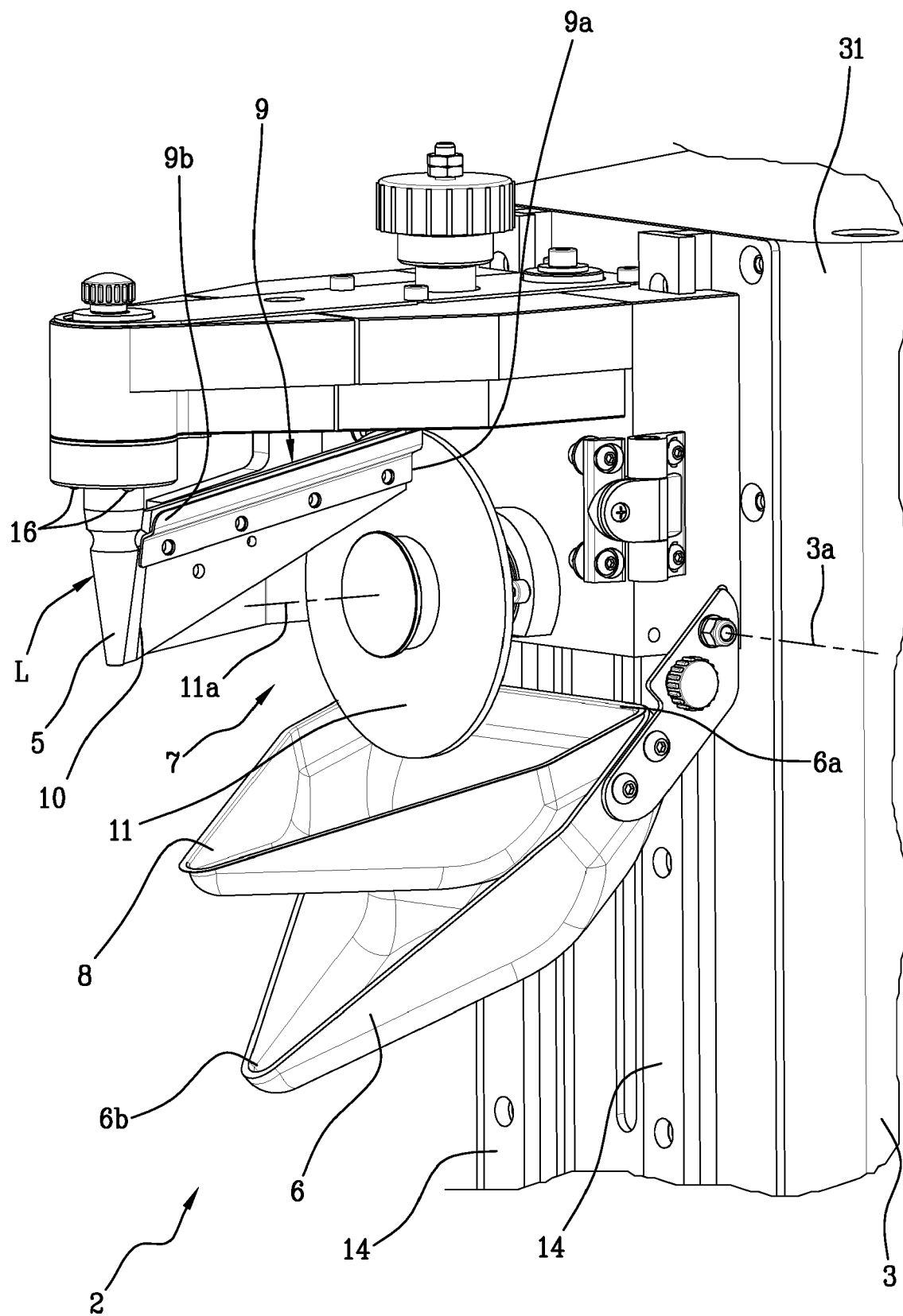


Fig.4

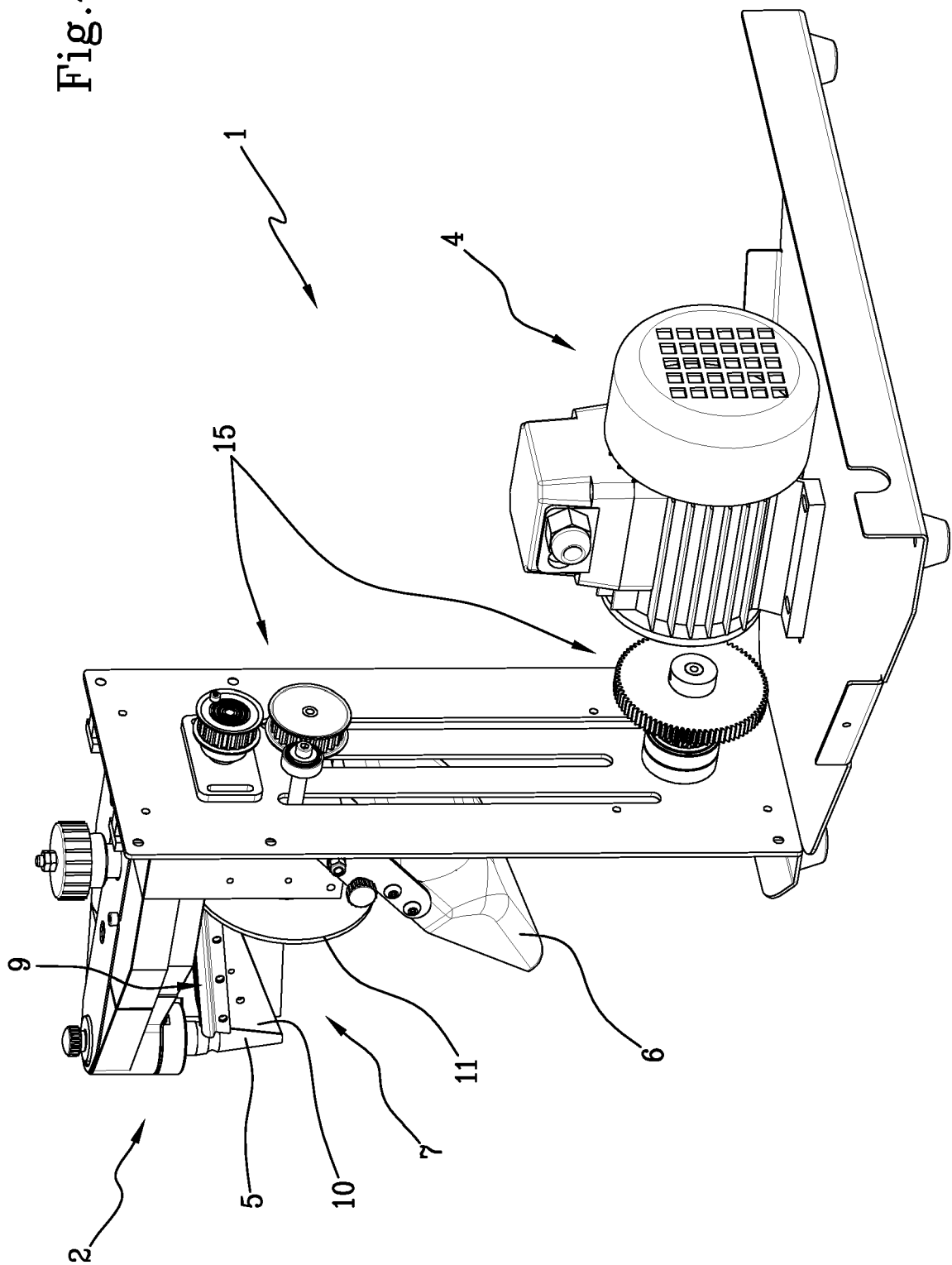


Fig.5

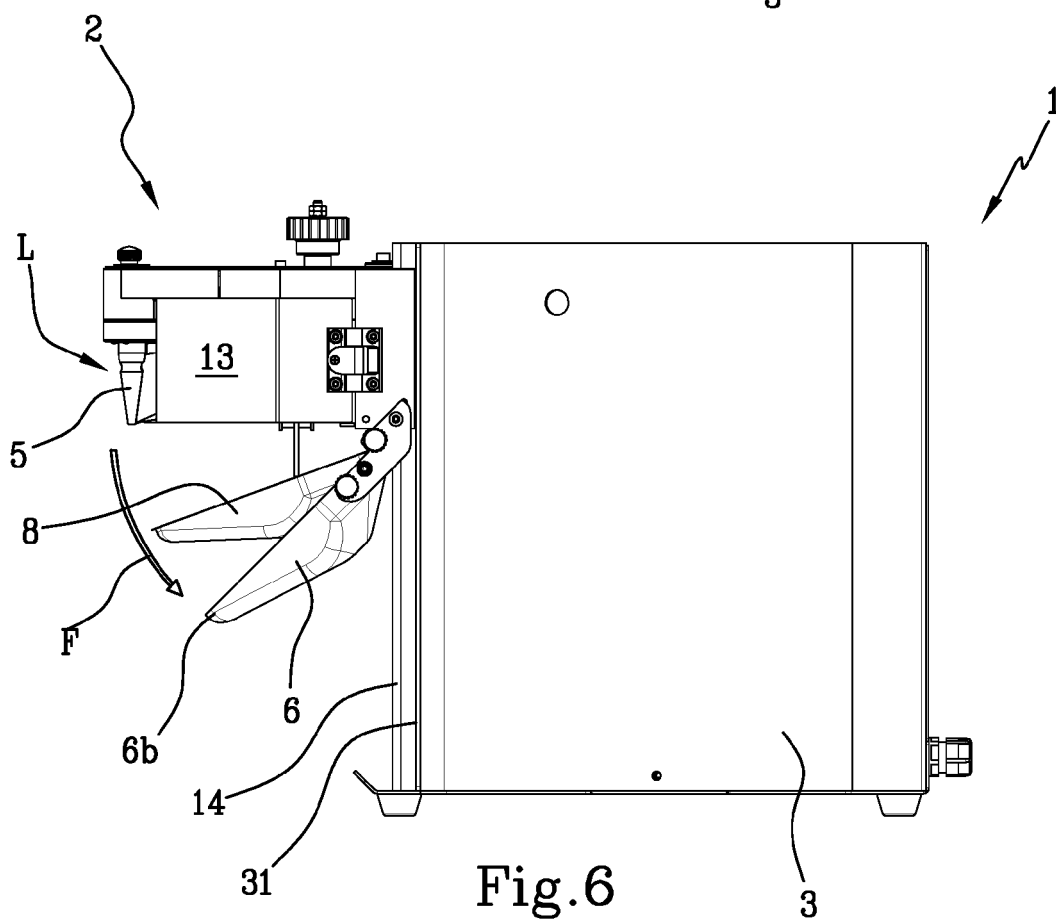
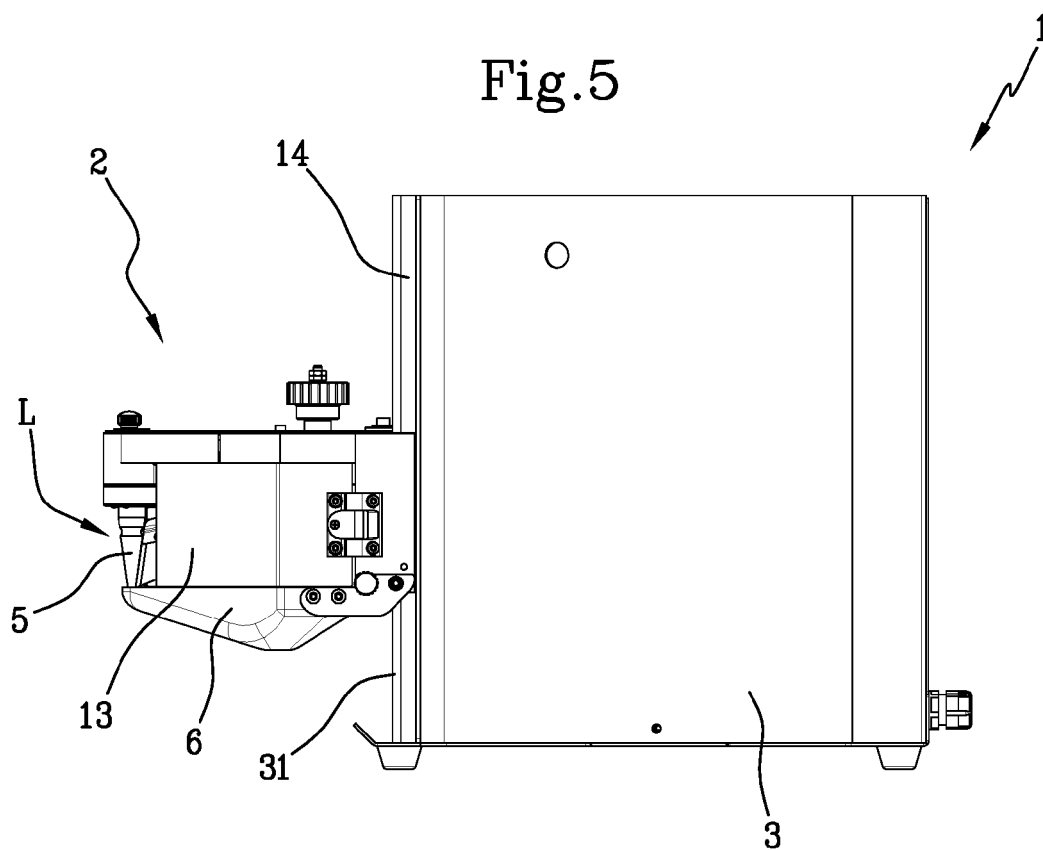
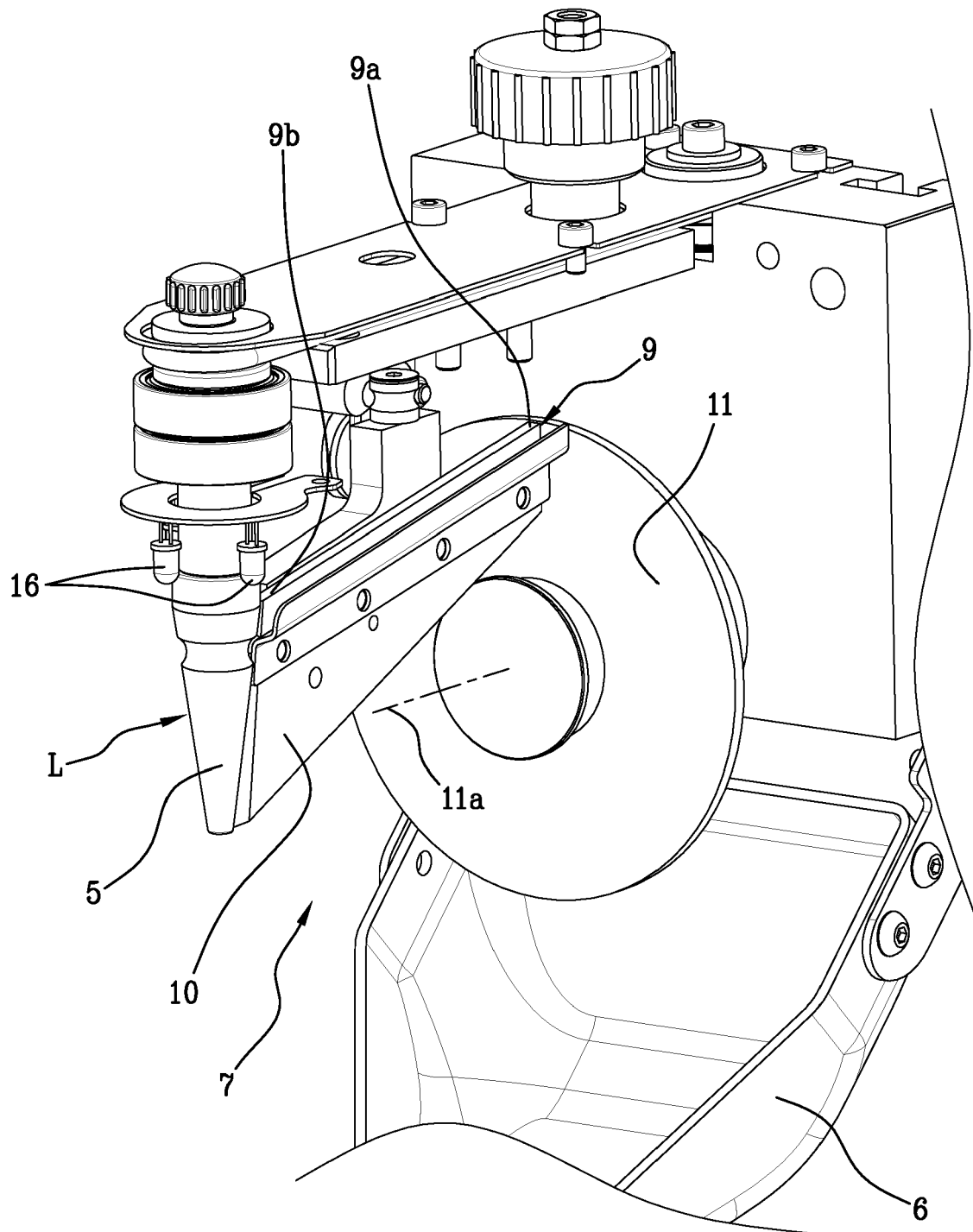


Fig.6

Fig.7





EUROPEAN SEARCH REPORT

Application Number
EP 17 15 6843

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Place of search Munich		Date of completion of the search 24 April 2017	Examiner Bichi, Marco
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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