

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
4 December 2008 (04.12.2008)

PCT

(10) International Publication Number
WO 2008/146140 A2

(51) International Patent Classification:
B05C 5/04 (2006.01) **B05C 11/10** (2006.01)

(21) International Application Number:
PCT/IB2008/001345

(22) International Filing Date: 21 May 2008 (21.05.2008)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
PD2007A000184 25 May 2007 (25.05.2007) IT

(71) Applicant (for all designated States except US): **FRAVOL EXPORT S.R.L.** [IT/IT]; Via Niedda, 6, I-35010 Peraga Di Vigonza (PD) (IT).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **SANDON, Mauro** [IT/IT]; Via Bortoletto, 3, I-35010 Limena (PD) (IT).

(74) Agent: **GALLO, Luca**; Gallo & Partners S.r.l., Via Trieste, 49, I-35121 Padova (IT).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

(54) Title: GLUE SPREADING APPARATUS

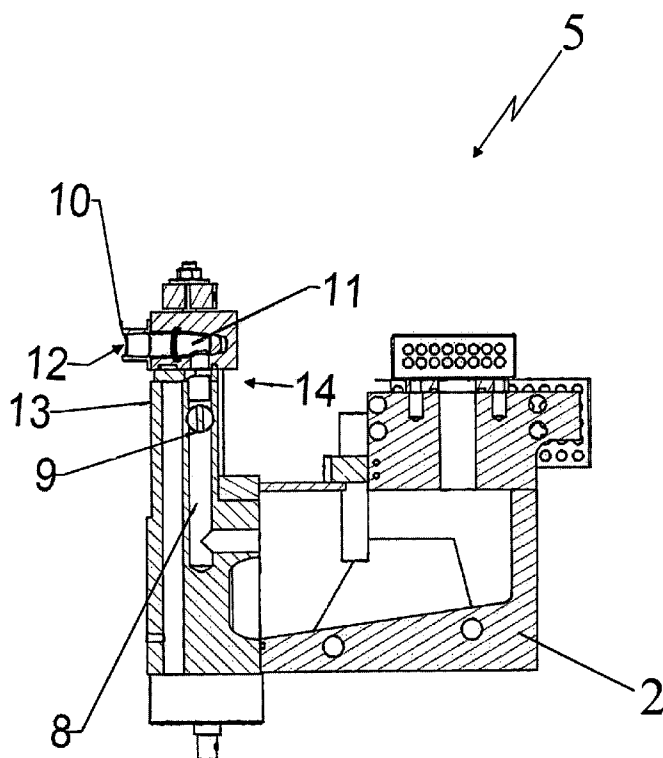


Fig. 5

(57) Abstract: Glue spreading apparatus, which comprises a containment tank carrying associated heating means to make the glue fluid and a glue distribution head suitable for picking the glue up from the containment tank and for spreading it on a tape through a dosaging roller. The head is provided with a return duct suitable for making the excess glue from the collection chamber defined by the dosaging roller go back into the containment tank. The distribution head carries an associated circulation valve arranged to interfere with the return duct, able to be moved between a first open position, which in normal operating conditions allows the glue to go back into the containment tank transferring the excess from the collection chamber, and a first closed position that prevents the glue from going back into the containment tank determining an overpressure upstream. The distribution head also carries an associated expulsion valve arranged to interfere with the return duct upstream of the circulation valve, which can be moved between a second closed position, which with said circulation valve in the first open position allows the inflow of glue from the collection chamber to the containment tank through the circulation valve, and a second open position, which with the circulation valve in closed position determines the outflow of the glue through an expulsion channel in communication with the return duct.

GLUE SPREADING APPARATUS

DESCRIPTION

The present finding concerns a glue spreading apparatus on tapes to allow their subsequent application on the edges of panels.

More clearly, the apparatus in question can be mounted preferably on the bench of a dedicated machine with manual forward movement of the panels or else it can be arranged inside a line for the flanging of panels equipped with many work groups arranged in series with one another and also comprising, for example, in addition to the present apparatus, butting, milling, grinding, trimming and other groups.

In the wood processing industry and in particular in the furniture industry, panels tend to be coated through the application of tapes, which are then finished by rounding their edges according to the desired profiles.

The tape is applied to the peripheral edge of each panel through the interposition of a layer of glue that the apparatus picks up from a containment tank and then spreads through a roller onto the tape whilst the latter passes through the apparatus to then compress the same tape on the edge of the panel.

The glue is of the thermofusible type (EVA) having a reversible reaction with heat, or else of the polyurethane type, having an irreversible reaction with heat and therefore particularly suitable for panels intended to be arranged close to heat sources or that require a particular seal against water.

As known, the reticulation process of polyurethane glue is promoted by humidity and by temperature. The same reticulation must, on the other hand, obviously take place as soon as the glue is applied hot on the edge of the panel.

The reticulation of polyurethane glues by means of the presence of humidity is, however, an only partially solvable problem, and indeed such a type of glue is normally

sold with the indication of the use by date, since it also reticulates, even if slowly, when conserved in a vacuum in its sales package.

The problem of the reticulation of polyurethane glue occurs in particular when after a work session is finished it is necessary to wait a considerable period of time before starting production again.

As known, indeed, the spreading apparatus requires planned operation stops that, for example, normally last for the break for the weekend.

Currently, based upon technology known up to now at the end of a work cycle it is necessary to dismount the tank and clean it of the remaining glue to avoid that when the next work cycle starts up the surface layer of glue that in the meantime has reticulated and therefore has hardened in contact with air does not allow the apparatus to operate correctly when restarting.

Therefore, normally after ordinary stops to start using the apparatus again it is necessary to first clean the tank. This means stopping the apparatus with inevitable costs due to the lack of production and costs in time and personnel to clean the apparatus.

Therefore, for cleaning reasons the tank must also preferably be practical and easy to disassemble in order to allow all of the areas where the glue can get stuck to be quickly reached.

In order to at least partially avoid this drawback it has for example up to now been foreseen to have many tanks for containing the glue so that while one is being cleaned the other can work.

However, this means a worsening of the costs for buying many tanks and in any case, whilst avoiding the problem of the machine having to be shut down, it does not completely solve the problems connected to the time and the personnel needing to be dedicated to the cleaning of the tanks.

More recently, at the end of the period of use of the apparatus for an ordinary stop, cleaning materials, in particular wax, are advantageously introduced instead of the glue, which by mixing with the glue avoid contact with air of the leftover film that remains on the walls.

Therefore, in the case of ordinary cleaning at the end of a work cycle it has become common practice to insulate the glue from the air and thus from humidity that is responsible to a greater extent for its reticulation by inserting a certain amount of wax inside the glue at the end of the cycle.

When activity starts again it is sufficient to wait for the complete expulsion of the wax (which is preferably dyed so as to be easily identified) before recommencing operation of the apparatus.

This solution, whilst proving more practical than the previous ones, is also not without drawbacks.

A first drawback consists of the fact that when the work cycle recommences it is necessary to completely expel the mixture of glue and wax waiting for the roller to expel all of the glue provided with wax residue that would not allow the tape to stick well onto the edge of the panel.

The removal of the glue mixed with wax takes place at the distribution roller and is rather difficult and takes quite a long time.

A further drawback consists of the fact that polyurethane glue is rather expensive and therefore, although there is generally only a minimal layer of glue in the tank when production is suspended, it is clear that especially in the case of frequent suspensions, a large amount of glue mixed with wax is thrown away.

In apparatuses that work with groups in line through which the panels automatically travel there are more sophisticated but very expensive systems to preserve the polyurethane glue preventing it from setting at the end of work.

For example, a known solution of spreading apparatus foresees the storage of polyurethane glue inside a tank in inert atmosphere, in particular in nitrogen.

The provision of a controlled inert atmosphere allows an undesired reticulation of the glue in the tank to be delayed.

The system with controlled atmosphere used by this machine, however, is rather expensive and does not lend itself to being used in cost-effective glue spreading apparatuses intended for machines with manual advancing of the panels.

There is also a known apparatus for spreading polyurethane glue provided with a tank equipped with a hatch for inserting the glue, which is kept at the right temperature inside the tank and, through an armoured, flexible and heated tube, is carried to a distribution device having an expulsion head with a plurality of holes to spread the glue uniformly on the passing panel. Such a solution has the advantage of allowing the lifetime of the polyurethane glue to be extended by keeping it out of contact with air.

This apparatus does, however, have the drawback of also being particularly expensive.

Currently, known solutions have paid little attention to the problems connected to the cleaning of the apparatus that up to now have been dealt with in a totally unsatisfactory manner.

In this situation, the problem forming the basis of the present invention is to avoid the drawbacks of already known solutions by providing a glue spreading apparatus that can be easily cleaned without dismounting the apparatus.

Another purpose of the present finding is to provide an apparatus that is constructively simple and operatively totally reliable.

The technical characteristics of the finding, according to the aforementioned purposes, can be clearly seen from the content of the claims shown below and its advantages shall become clearer in the following detailed description, made with reference to the attached drawings, which represent an embodiment purely as an example and not for limiting purposes, in which:

- figures 1 and 2 show two overall perspective views of a machine for gluing edges to panels, with a glue spreading apparatus according to the invention mounted;
- figure 3 schematically shows an overall perspective view of the glue spreading apparatus according to the invention;
- figure 4 schematically shows a side view of the apparatus of figure 3;
- figure 5 shows a section view of the apparatus of figure 4 carried out along the line A-A of the same figure 4.

With reference to the attached drawings, the glue spreading apparatus object of the present finding has been wholly indicated with 1.

The apparatus 1 in question can be arranged on in-line machines for the edging of panels as gluing group arranged in series with other work groups or else preferably it can be associated with a dedicated machine (indicated with A in figures 1 and 2) for gluing edges to panels with manual advancing of the panels.

The machine A is provided with a support framework rested on the floor equipped with a work surface 3 on which the apparatus 1 according to the invention is mounted in turn provided with a support structure 2.

On the work surface 3 a containment tank 4 for containing the glue is mounted.

Such a containment tank 4 is capable of receiving both polyurethane glue, in particular in cartridge form and thermofusible glue (for example EVA) in particular in the form of grains or beads.

The containment tank has associated heating means of the glue to transform it to fluid state, *per sé* known, preferably consisting of electrical resistances not illustrated in the figures.

The containment tank 4 feeds, preferably through an Archimedean screw, a head 5 for the distribution of the glue suitable for spreading it on a tape (or on a panel) through a dosaging roller 6 rotating in contact with the same tape.

Advantageously, a paddle 7 is foreseen that is thrust elastically to press the tape against the roller 6.

In accordance with a preferred characteristic of the invention, the containment tank 4 and the distribution head 5 of the glue are made from highly viscous material, in particular consisting of aluminium covered with teflon.

The dosaging roller 6 is made to rotate by a motor through transmission means preferably comprising a transmission shaft rotatably supported by bearings and suitable for transmitting motion to the dosaging roller 6 receiving it through a cardan joint from an actuation shaft connected to the motor.

The support structure 2 of the apparatus is made so as to allow simple and easy disassembly of the containment tank 4 of the glue for replacement with another different size or functional characteristic for example connected to the type of glue.

Inside the body of the glue distribution head 5 a return duct 8 is foreseen suitable for making the glue that has arrived in excess in a collection chamber defined by the dosaging roller go back into the containment tank 4 through the effect of the rotation of said dosaging roller.

The distribution head 5 comprises a circulation valve 9 placed in interference with the return duct 8, which is able to be moved between a first open position, which in normal operating conditions allows the glue to go back into the containment tank 4 transferring

the excess from the collection chamber, and a first closed position that prevents the glue from going back into the containment tank 4 determining an overpressure upstream of the same circulation valve 9.

An expulsion valve 10 is also foreseen, placed in interference with the return duct 8 upstream of the circulation valve 9 and able to be moved between a second closed position, which with the circulation valve 9 in the first open position allows the inflow of glue from the collection chamber to the containment tank 4 through the circulation valve 9, and a second open position, which with the circulation valve 9 in closed position determines the outflow of the glue through an expulsion channel 11 placed in communication with the return duct 8.

Thanks to the circulation of the glue during normal operation of the apparatus 1 it is possible to keep the same glue at a uniform and constant spreading temperature.

In accordance with a different embodiment of the present invention the circulation valve 9 and the expulsion valve 10 are replaced by a three-way valve (not illustrated) that selectively places the collection chamber in communication with the containment tank 4 through the aforementioned return duct 9 and with the aforementioned expulsion channel 11.

The latter ends with an outlet mouth 12 preferably arranged on the outer side 13 of the glue distribution head 5, opposite the inner side 14 where the dosaging roller 6 is arranged to distribute the glue.

The circulation valve 9 and the expulsion valve 10 are inserted too intercept the return duct through seats formed on the upper face of the distribution head.

The glue that comes out from the outlet mouth 12 can be easily collected in a suitable container.

Therefore, operatively, at the end of a work cycle it is easy to take care of the evacuation of the glue remaining in the containment tank 4 and in the distribution head 5 by simply acting on the two valves, i.e. by displacing the return valve 9 into closed position and displacing the expulsion valve 10 into open position preferably by rotating the valves in the seats by an angle of 90 degrees.

Of course, moreover, the present finding can, in its practical embodiment, also take up different shapes and configurations to the one illustrated above without for this reason departing from the present scope of protection.

Moreover, all of the details can be replaced by technically equivalent elements and the sizes, the shapes and the materials used can be whatever according to needs.

CLAIMS

1. Glue spreading apparatus, in particular on tapes characterised in that it comprises:

- a support structure;
- at least one tank for containing the glue connected to said support structure and carrying associated heating means to make the glue fluid;
- a glue distribution head suitable for picking up the glue from said containment tank and for spreading it on a tape or on an edge of a panel through a dosaging roller rotating in contact with said tape or with said edge of a panel, said head being provided with a return duct suitable for taking the excess glue back into the containment tank from a collection chamber defined by said dosaging roller;

characterised in that it comprises at least one circulation valve arranged to interfere with said return duct, able to be moved between a first open position, which in normal operating conditions allows the glue to go back into the containment tank transferring the excess from said collection chamber, and a first closed position that prevents the glue from going back into the containment tank determining a overpressure upstream; an expulsion valve arranged to interfere with said return duct upstream of said circulation valve able to be moved between a second closed position, which with said circulation valve in said first open position allows the inflow of glue from said collection chamber to said containment tank through said circulation valve, and a second open position, which with said circulation valve in closed position determines the outflow of the glue through an expulsion channel in communication with said return duct.

2. Apparatus according to claim 1, characterised in that said circulation valve and said expulsion valve are replaced by a three-way valve that places said collection chamber

selectively in communication with said containment tank through said return duct and with said expulsion channel.

3. Apparatus according to any one of the previous claims, characterised in that said expulsion channel ends with an outlet mouth arranged on the outer side of said distribution head opposite the inner side where said dosaging roller is arranged for the distribution of the glue on said tape or panel edge.

4. Apparatus according to any one of the previous claims, characterised in that said circulation valve and said expulsion valve intercept said return duct starting from seats formed from the upper face of said glue distribution head.

5. Apparatus according to claim 1, characterised in that said distribution head is made from aluminium coated with teflon.

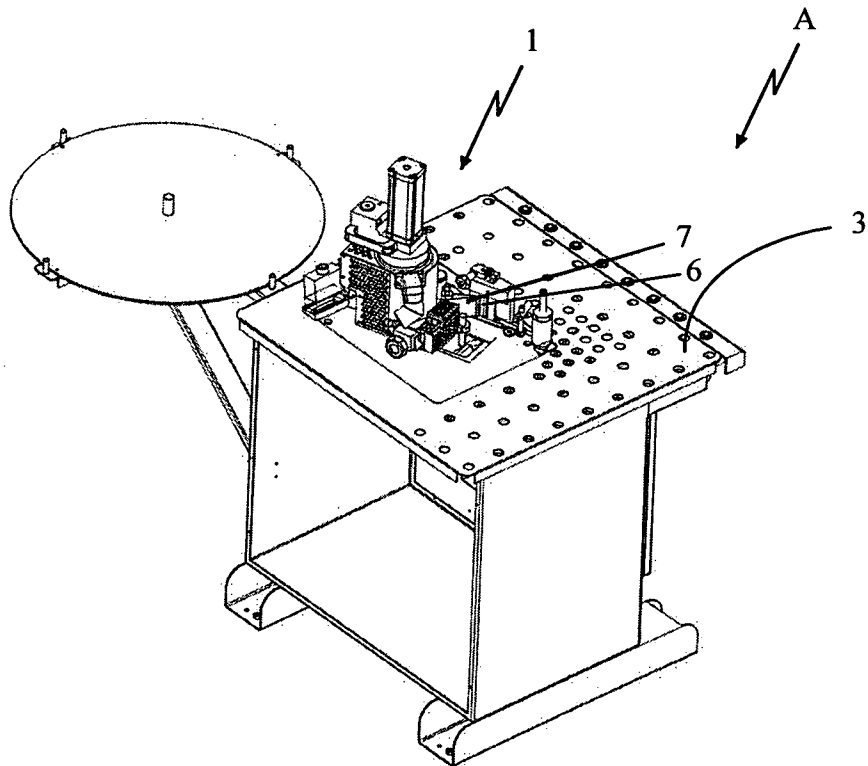


Fig. 1

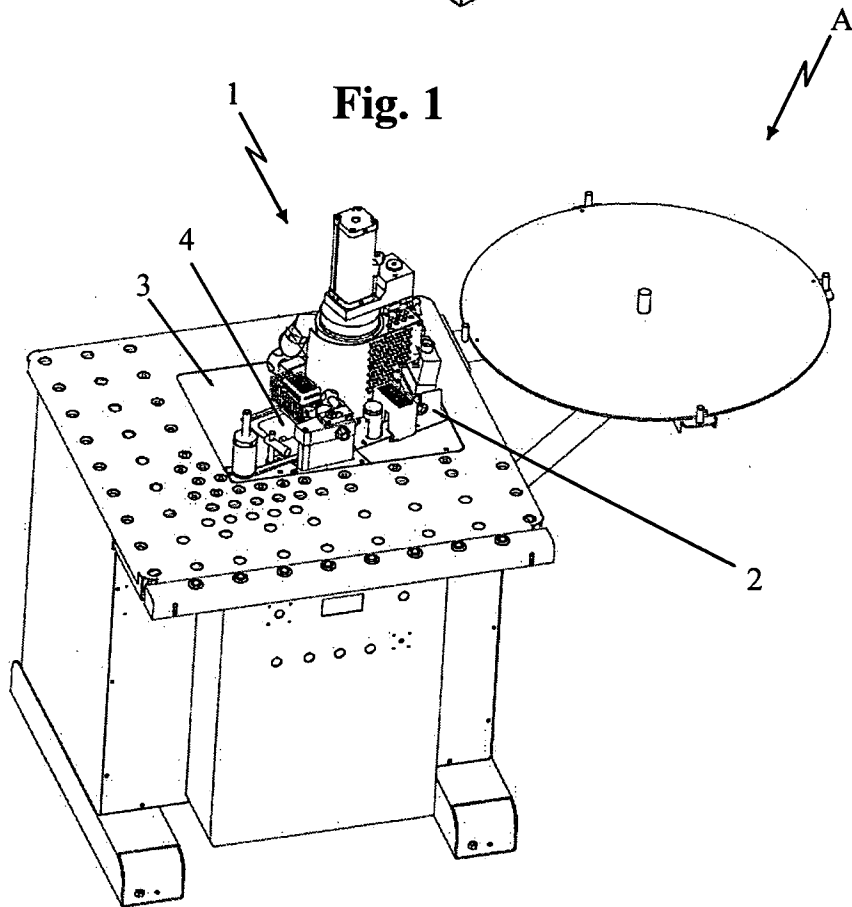


Fig. 2

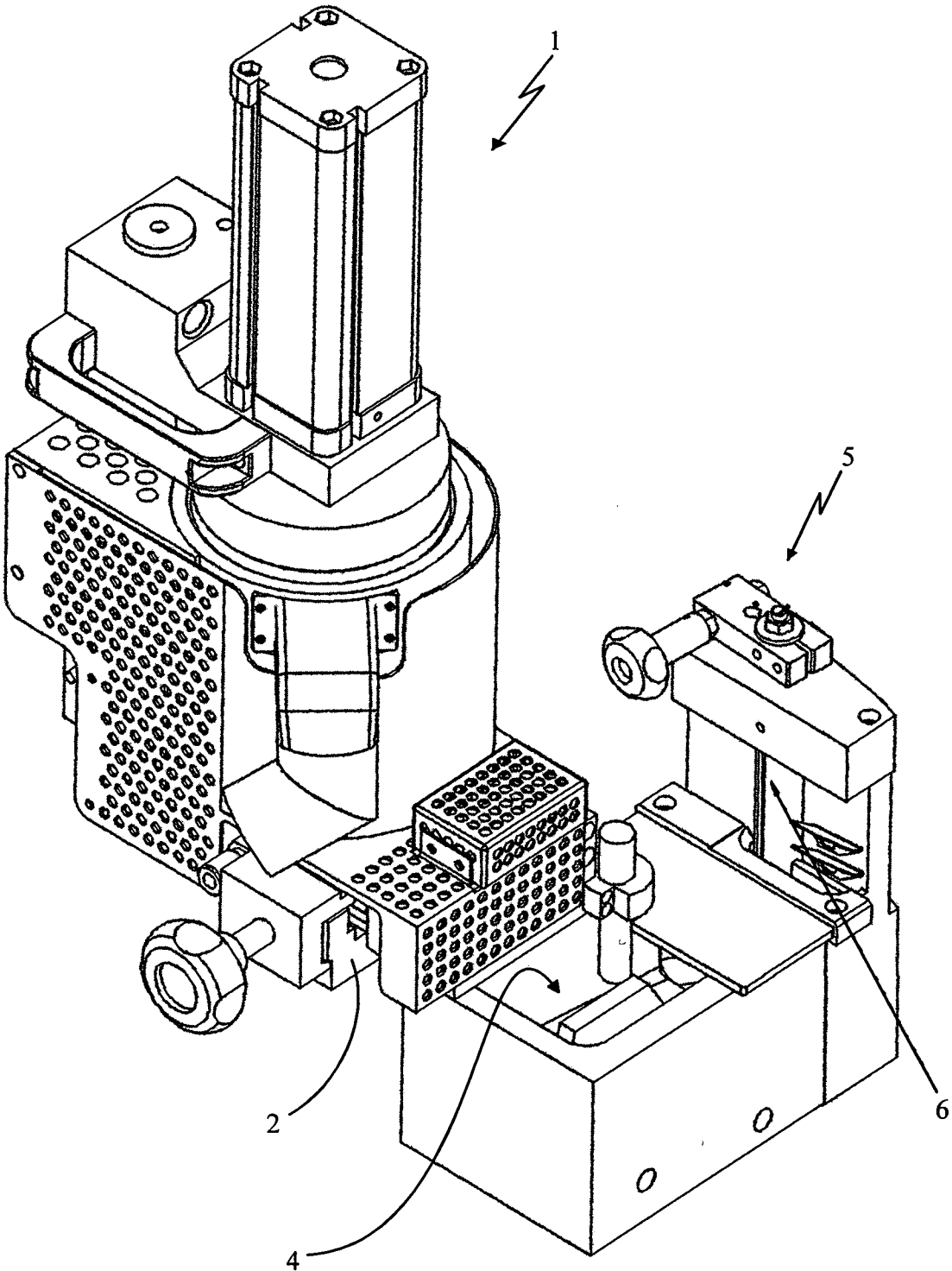


Fig. 3

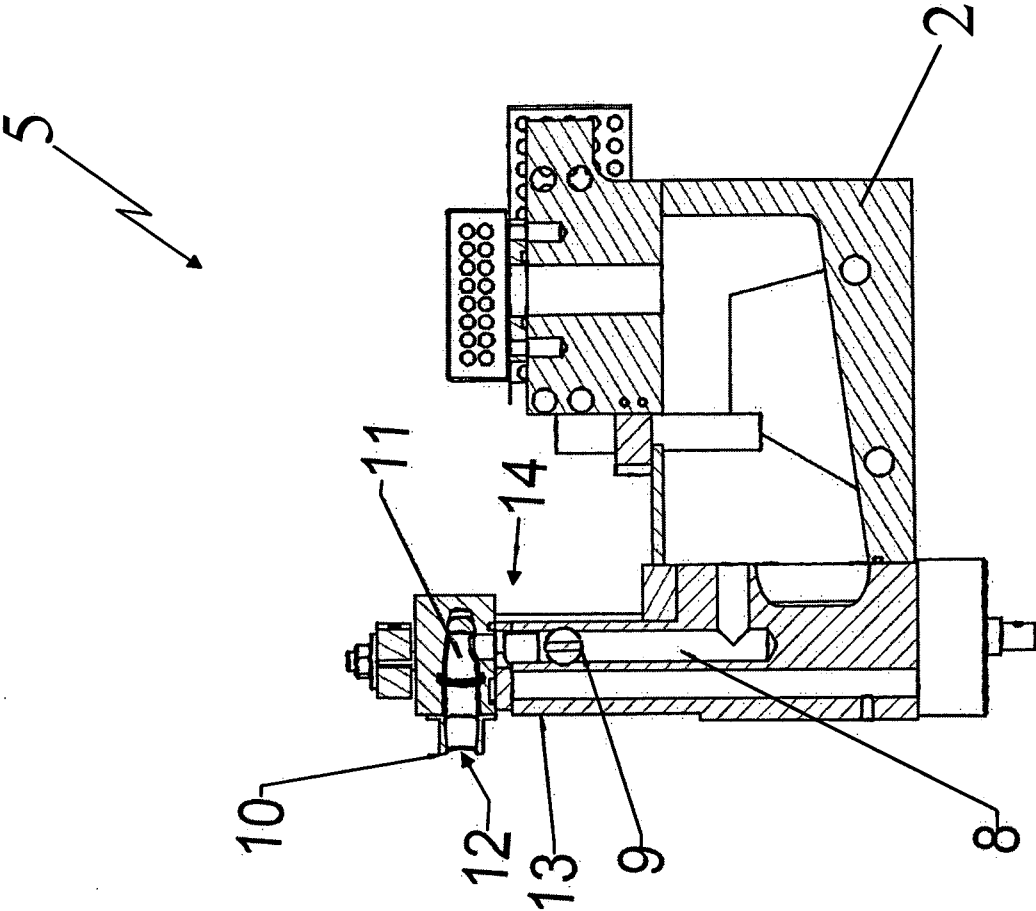


Fig. 5

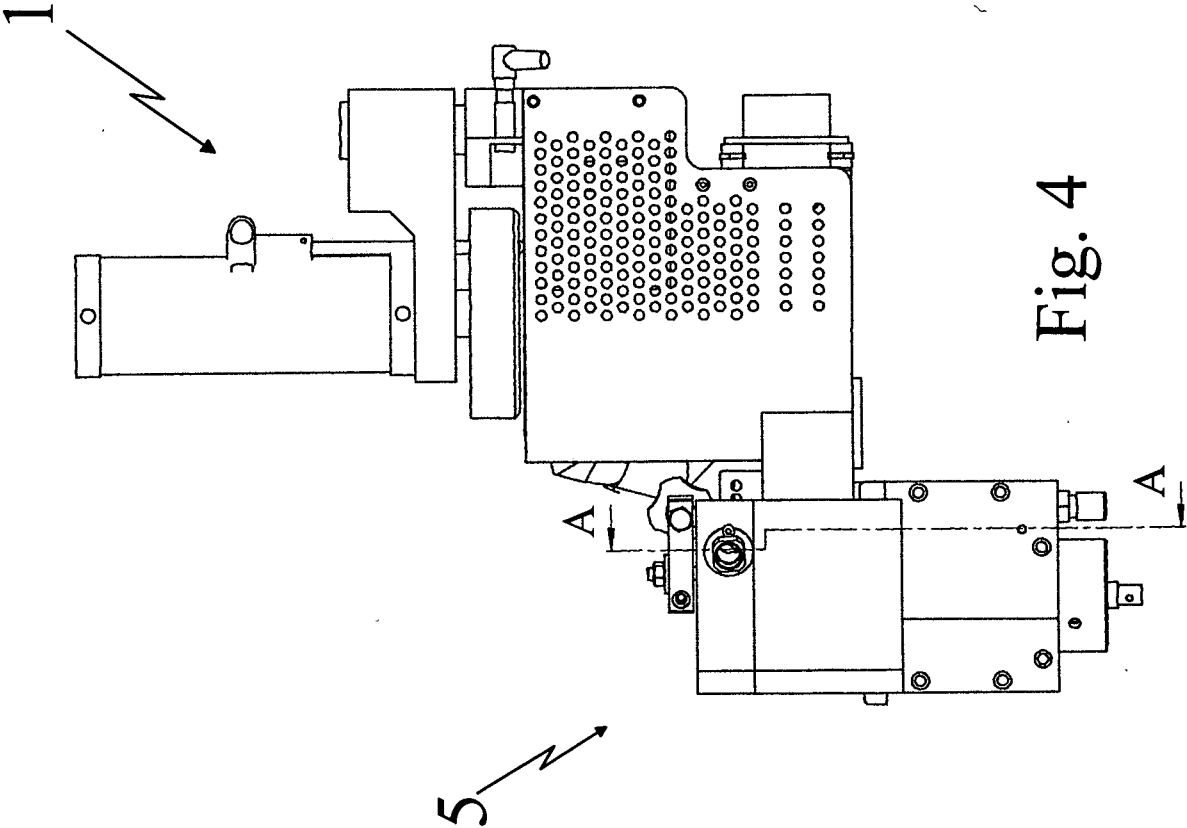


Fig. 4