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(54) Glue applicator for bookbinding machines

(57) A new glue applicator for perfect binding machines with one or more distributors (3a, 3b) for the glue coming from two or more tanks and a main duct (23) for supply of the glue to said distributor/s (3a, 3b), and wherein two or more peripheral glue supply ducts (21a, 21b), each connected to at least one of said tanks, flow into said main supply duct (23), each of said peripheral supply ducts (21a, 21b) comprising, upstream of the confluence (24) with said main supply duct (23), at least one opening/closing valve (22a, 22b) suitable for permitting or preventing the supply of glue to said main supply duct (23).

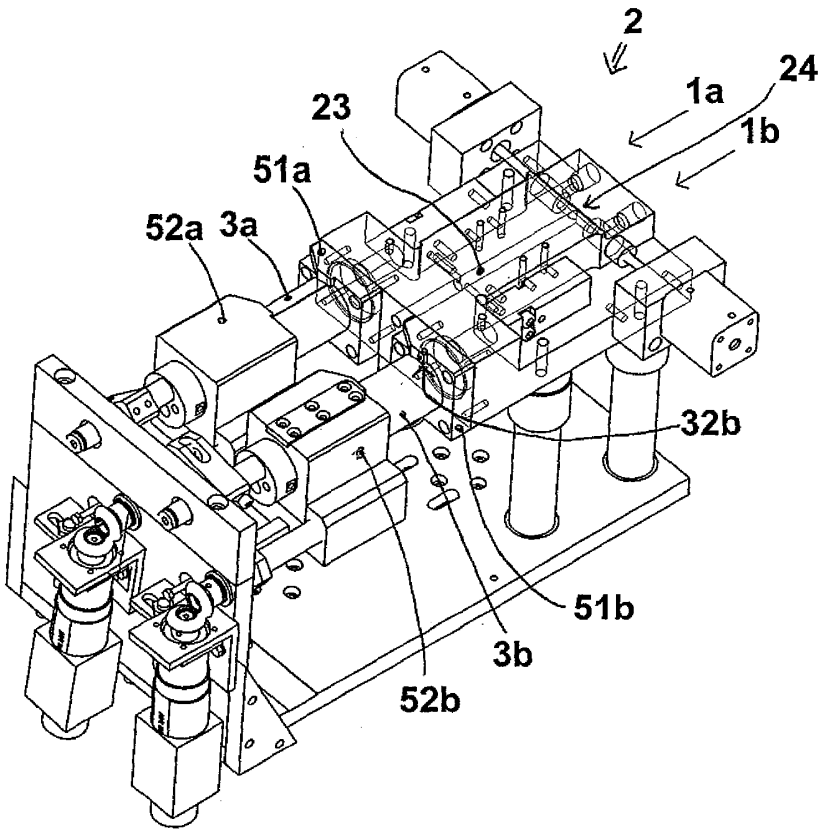


Fig. 1

EP 2 133 213 A1

Description

[0001] The present patent relates to machines for bookbinderies, sorters for books and volumes and perfect binding machines and in particular concerns a new glue applicator for perfect binding machines, with device for alternate or simultaneous supply of glue coming from two or more separate tanks.

[0002] Automatic machines are known for binding signatures which comprise one or more clamps, a vibrating surface, at least one cutter, one or more rollers and blades for application of the hot-melt glue, a cover application device and a press.

[0003] Each signature stack constituting a book or volume to be bound is positioned, manually or mechanically, in the clamp, which transports said stack throughout the binding sequence.

[0004] The stack transported by the clamp is conveyed onto the vibrating surface which aligns the sheets.

[0005] The stack is then sent to the cutter which levels off, by removal of material, all the backs of the sheets.

[0006] The rollers and blades spread the hot-melt glue onto the spine and if necessary also onto the margin of the first and last sheet in the vicinity of the spine.

[0007] The cover application device positions each cover to be folded or pre-folded on the cover presser which attaches the cover to the stack.

[0008] The rollers and blades for spreading the holt-melt glue are partially immersed in one or more heated tanks containing the glue.

[0009] For perfect binding, hot-melt glue is used which is solid at ambient temperature and becomes liquid when heated to a certain temperature value. Said value varies according to the type of glue used and makes said glue fluid enough for application.

[0010] The hot-melt glue involves considerable problems and disadvantages, in addition to many limits.

[0011] In order to be used, the hot-melt glue must be brought to high temperatures, therefore the parts in contact with the glue are at high temperature, with the consequent risk of burns for the operators.

[0012] Furthermore, the new types of paper, which are increasingly sophisticated in terms of consistency, given the presence on the surface of protective plastic coatings, and the new types of printing ink, limit the result in terms of adhesion of the hot-melt glue since the support on which it is applied is no longer a mixture of cellulose, but plastic, PVC or other, and therefore there is often the need to use other specific types of glue, applied by means of special procedures.

[0013] In addition to this, the amount of glue deposited on the stack is not constant but also depends on how much glue is collected by the rollers and blades from the relative tanks, i.e. on the quantity of glue contained in the tanks. The same applicant is the holder of a patent application PD2006A000260 concerning a glue applicator for perfect binding machines which solves said and other drawbacks. Said applicator comprises at least one glue tank connected to one or more glue distributors, provided with mechanisms for delivery/interruption of the glue, one or more pairs of stack guides and two or more components for application of the glue.

[0014] Said tank, provided with hermetically sealed cover, contains glue which is liquefied by heating of the tank itself and conveyed through ducts to the distributors by means of a device which increases the pressure inside the tank.

[0015] Said distributors consist of cylinders positioned horizontally and square to the direction of forward movement of the stack.

[0016] Said glue applicator for perfect binding machines requires a lower working temperature of the various glue distribution parts and the glue itself and also permits the use of other glues, for example polyurethane glues, in addition to the normal hot-melt glue, for perfect binding.

[0017] Furthermore, by using two or more tanks, each one connected to the relative distributor, it is possible to use and apply different types of glue during the same perfect binding operation.

[0018] The main drawback of said applicator with several tanks consists in the fact that it requires a number of supply ducts equal to the number of tanks, i.e. each tank serves one single supply duct, in turn connected to the distributor.

[0019] Therefore, in order to use two or more types of glue, the applicator must be provided with at least a corresponding number of supply ducts and distributors, each distributor being in turn provided with stack guides and other mechanisms necessary for correct operation.

[0020] The applicator is therefore structurally and functionally complex, since it is not possible to deliver two different types of glue from one single distributor.

[0021] To remedy the above drawbacks a new type of glue applicator for perfect binding machines has been designed and produced with device for alternate or simultaneous glue supply from two or more separate tanks.

[0022] The main aim of the present invention is to permit the use of two or more types of glue, supplied to each distributor alternately or simultaneously during the same binding operation, by means of one single main supply duct.

[0023] A further object of the new applicator is to permit the use not only of the normal hot-melt glue but also other glues, for example polyurethane glues, for perfect binding.

[0024] A further advantage of the present invention is that it is structurally and functionally simple, since the overall number of components for delivery of the glue is reduced.

[0025] A further advantage of the present invention is that two or more types of glue can be mixed, before delivery and application.

[0026] These and further objects, direct and complementary, are achieved by the new glue applicator for perfect binding machines with device for alternate or simul-

taneous glue supply from two or more separate tanks, each connected, via relative peripheral supply duct, to one single main supply duct communicating with one or more distributors, and where each of said peripheral supply ducts comprises, upstream of the confluence with said main supply duct, at least one opening/closing valve suitable for permitting or preventing the supply of glue to said main supply duct.

[0027] Therefore, with the new applicator it is possible to supply to the same distributor, via said main supply duct, one or more types of glue contained in two or more separate tanks, without using different distributors for each glue or for each tank, with considerable reduction in the overall number of components.

[0028] The operation of said opening/closing valves of each peripheral supply duct is synchronised according to the type and quantity of glue to be used in the particular binding phase.

[0029] For example, a first type of glue can be used suitable for application on stacks made of a certain material alternating with a second type of glue suitable for application on different materials.

[0030] It is also possible for two or more of said valves to be simultaneously open, so that two or more types of glue are mixed in said main supply duct, before delivery and application.

[0031] The characteristics of the new glue application unit for perfect binding machines will be better illustrated by the following description with reference to the drawings, attached by way of non-limiting example.

[0032] Figures 1, 1a, 1b and figure 2 show three-dimensional and plan views of embodiment examples, with one or two distributors, of the new glue applicator for perfect binding machines, with a device (2) for the alternate/simultaneous supply of glue coming from at least two separate supply lines (1a, 1b), each connected to the relative tank, not shown in the figure.

[0033] Figures 3, 4, 5 and 6 schematically show operation of the device (2) for alternate/simultaneous supply of glue from at least two separate supply lines (1a, 1b).

[0034] As shown in figure 3, said device (2) is suitable for supplying the glue coming from one single line (1a, figure 3; 1b, figure 4), interrupting the supply of glue from the other line.

[0035] As shown in figure 4, said device (2) is also suitable for completely interrupting the supply from both the lines (1a, 1b) or, as in figure 6, is suitable for simultaneously supplying the glue coming from both the lines (1a, 1b).

[0036] In said example, the new applicator comprises two or more peripheral ducts (21a, 21b) for supply of glue from two separate lines (1a, 1b), each connected to a relative glue tank, and one single main supply duct (23) into which said peripheral ducts (21a, 21b) flow (24), said main supply duct (23) being connected to one or more glue distributors (3a, 3b), and where each of said peripheral ducts (21a, 21b) comprises, upstream of said confluence (24) in said main supply duct (23), at least one valve (22a, 22b) for opening/closing the glue supply.

[0037] In the preferred solution, said valve (22a, 22b) comprises an actuator with a translating piston suitable for partially or totally blocking opening of the relative peripheral supply duct (21a, 21b).

[0038] The new applicator furthermore comprises devices for control of the temperature and pressure inside said tanks and for control of the temperature of the mechanical parts crossed by the glue, suitable for guaranteeing the best glue fluidity conditions.

[0039] Analogously to applicators of known type, said glue distributors (3a, 3b) comprise in turn further glue delivery/interruption mechanisms suitable for opening/closing the holes for outlet of the glue from said distributors (3a, 3b).

[0040] Each distributor (3a, 3b) furthermore comprises preferably at least one pair of guides (51a, 52a, 51b, 52b) for positioning of the stack to be bound.

[0041] In the example shown in the figure, said glue applicator comprises at least two distributors (3a, 3b), where said main supply duct (23) feeds both said distributors (3a, 3b), or comprises at least one branch (25) splitting into two or more further ducts (25a, 25b), each connected to the relative distributor (3a, 3b).

[0042] The operation of said valves (22a, 22b) is synchronised so as to supply alternately or simultaneously the glue coming from said two separate lines (1a, 1b).

[0043] As in figure 3 and figure 4, at least one of said valves (22a, 22b) can be open while the other is closed so as to supply alternately, to both distributors (3a, 3b), only one type of glue (1a in figure 3; 1b in figure 4).

[0044] As in figure 5, all the valves (22a, 22b) can be closed, interrupting supply of all the types of glue or, as in figure 6, all the valves (22a, 22b) can be open, permitting simultaneous supply of both types of glue to both the distributors (3a, 3b).

[0045] In the latter configuration, the glue delivered is a mixture of the glues or substances generally fed to said main supply duct (23).

[0046] In the example shown in figures 1 and 2, said distributors (3a, 3b) each comprise a duct which is positioned horizontally and square to the direction of forward movement of the stack and is provided with valves or mechanisms for supply/interruption of the glue.

[0047] The distributor (3a) which is encountered first by the stack is provided in its upper part with a slit (31a) parallel to the length of the distributor (3a). The glue applied to the spine flows out of said slit (31a).

[0048] The distributor (3b) encountered second by the stack in transit is provided with two holes or apertures (32b) in its upper part, corresponding to the two guides (51b, 52b). The glue applied on the margin of the first and last sheet in the vicinity of the spine flows out via said holes or apertures (32b).

[0049] On or in each of said distributors (3a, 3b) there is a mechanism or valve for supply/interruption of delivery of the glue coming from the tank, comprising a further inner cylindrical duct or shutter housed inside the relative

distributor (3a, 3b), adhering to the inner portion of the slits or holes (31a, 32b) of the distributor (3a, 3b). The wall of said shutter is provided with holes or slits with form, dimension and position corresponding to the holes or slits (31a, 32b) of the distributors (3a, 3b).

[0050] Each shutter protrudes from the relative distributor (3a, 3b) on the side opposite the tank and has said end mechanically closed. On said end of the protruding inner shutter levers and/or electromechanical or pneumatic mechanisms are applied suitable for partially rotating said inner shutter on its central axis. Via said rotation the holes or slits of the inner shutter are aligned or misaligned with the holes or slits of the relative distributor (3a, 3b).

[0051] In particular the guides (51b, 52b) of the distributor (3b) encountered second by the stack are provided with holes or apertures, on their surface in contact with said distributor (3b), communicating with holes or apertures present on their surface facing the opposite guide (51a, 52a).

[0052] In this way the glue coming out of the holes (32b) of the second distributor (3b) is conveyed and applied on the margin in the vicinity of the spine of the first and last sheet of the stack passing between said guides (51b, 52b).

[0053] Furthermore, the new applicator can also comprise a mechanism for partial suction of the glue contained in the supply ducts (3a, 3b) and in the shutters, thus ensuring a very precise flow start action and clear interruption of extrusion of the glue in the glue application area.

[0054] Therefore with reference to the preceding description and the accompanying drawings, the following claims are made.

Claims

1. Glue applicator for perfect binding machines **characterised in that** it comprises:

   • one or more distributors (3a, 3b) of the glue coming from two or more tanks;
   • a main duct (23) for supply of the glue to said distributor/s (3a, 3b);

   and wherein two or more peripheral ducts (21a, 21b) for supply of the glue, each one connected to at least one of said tanks, flow into said main supply duct (23), each of said peripheral supply ducts (21a, 21b) comprising, upstream of the confluence (24) with said main supply duct (23), at least one opening/closing valve (22a, 22b) suitable for permitting or preventing the supply of glue to said main supply duct (23).

2. Glue applicator, according to claim 1, **characterised in that** said valves (22a, 22b) of said peripheral supply ducts (21a, 21b) operate so as to supply alternately to said main supply duct (23) the glue (1a, 1b) coming from one of said peripheral supply ducts (21a, 21b).

3. Glue applicator, according to claims 1, 2, **characterised in that** said valves (22a, 22b) of said peripheral supply ducts (21a, 21b) operate so as to supply simultaneously to said main supply duct (23) the glue (1a and 1b) coming from two or more of said peripheral supply ducts (21a, 21b).

4. Glue applicator, according to claims 1, 2, 3, **characterised in that i**t comprises two or more glue tanks, each one suitable for containing different glues in terms of composition and/or quality and/or working and/or drying temperature.

5. Glue applicator, according to claims 1, 2, 3, 4, **characterised in that** it comprises two or more of said distributors (3a, 3b), and wherein said main supply duct (23) comprises at least one branch (25) splitting into two or more further ducts (25a, 25b), each one connected to the relative distributor (3a, 3b).

6. Glue applicator, according to the preceding claims, **characterised in that** each of said distributors (3a, 3b) comprises a duct positioned horizontally and square to the direction of forward movement of the stack and provided with valves or mechanisms for supply/interruption of the glue.

7. Glue applicator, according to the preceding claims, **characterised in that** each of said tanks comprises a device for control of the pressure inside the tank.

8. Glue applicator, according to the preceding claims, **characterised in that** it comprises:

   • at least one pair of guides (51a, 52a, 51b, 52b) for the stacks positioned on each distributor (3a, 3b);
   • at least one glue application component suitable for applying the glue on the spine of the stack in transit, connected to one of said distributors (3a) and positioned between said guides (51a, 52a) of said distributor (3 a);
   • at least one pair of lateral components for glue application suitable for applying the glue on the margin of the first and last sheet in the vicinity of the spine of the stack in transit, and wherein said lateral components for application are connected to a distributor (3b) and are positioned between the guides (51b, 52b), as a continuation of the guides (51b, 52b) or on the guides (51b, 52b) of said distributor (3b).

9. Glue applicator, according to claim 8, **characterised**

in that said component for application of the glue on the spine of the stack consists of a slit or aperture (31a) on the upper part of the distributor (3a).

10. Glue applicator, according to claim 8, **characterised in that** each of said components for application of the glue on the margin of the first and last sheet in the vicinity of the spine of the stack consists of a series of holes or apertures (32b) present on the surface of each guide (51b, 52b) facing the opposite guide (52b, 51b) and communicating with the inside of said distributor (3b).

11. Glue applicator, according to the preceding claims, **characterised in that** the guides (51a, 51b) nearest the tank are fixed, and wherein the guides (52a, 52b) farthest from the tank can be translated.

12. Glue applicator, according to the preceding claims, **characterised in that** each mechanism for supply/interruption of the glue of each distributor (3a, 3b) comprises a shutter or cylindrical duct housed and rotating inside the relative distributor (3a, 3b) and adhering to the inner portion of the slits or holes (31a, 32b) of the distributor (3a, 3b), and wherein the wall of said shutter is provided with holes or slits of form, dimension and position corresponding to said holes or slits (31a, 32b) of the relative distributor (3a, 3b), and wherein the rotation of said shutter aligns or misaligns the holes or slits of the shutter with the holes or slits of the distributor (3a, 3b), permitting or preventing passage of the glue through the holes or slits of the distributor (3a, 3b).

13. Glue applicator, according to the preceding claims, **characterised in that** it comprises at least one mechanism for partial suction of the glue contained in the supply ducts (3a, 3b) and in the shutters in order to ensure a very precise flow start action and a clear interruption of extrusion of the glue in the glue application area.

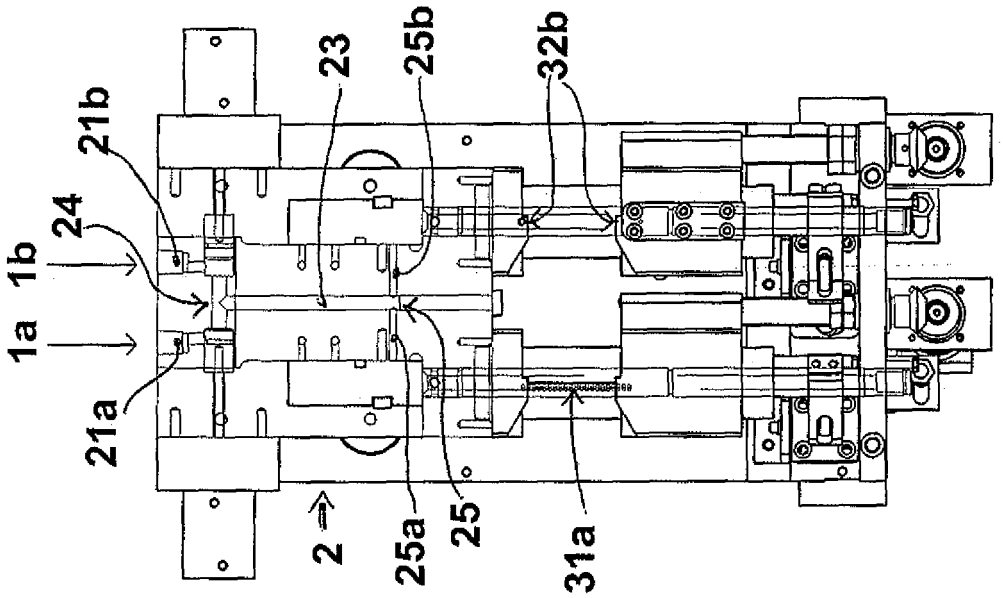
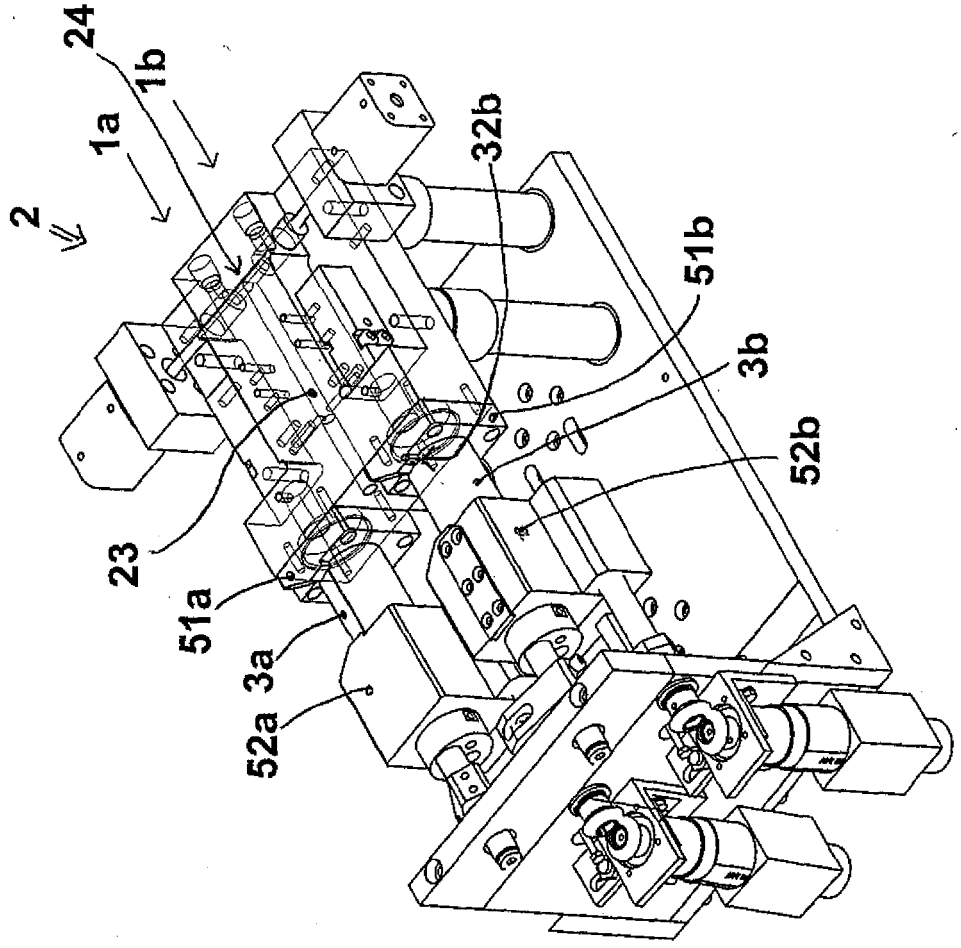

21b
24
1b
1a
21a
23
25b
32b
2
25a
25
31a

Fig. 2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1a
2
32b
51b
3b
52b
23
51a
3a
52a

Fig. 1

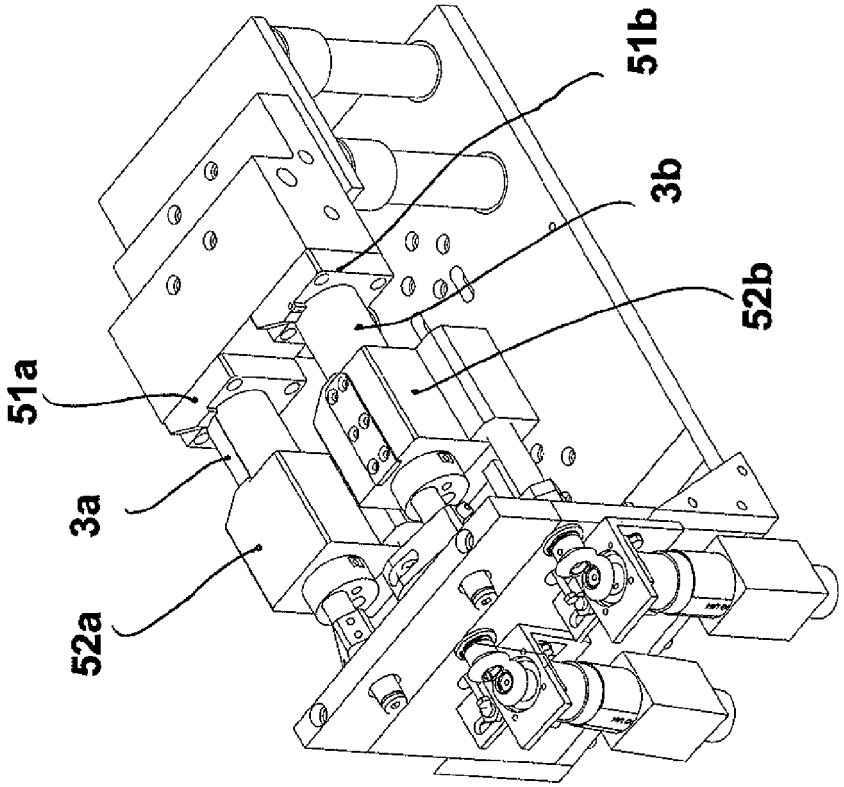

Fig. 1b

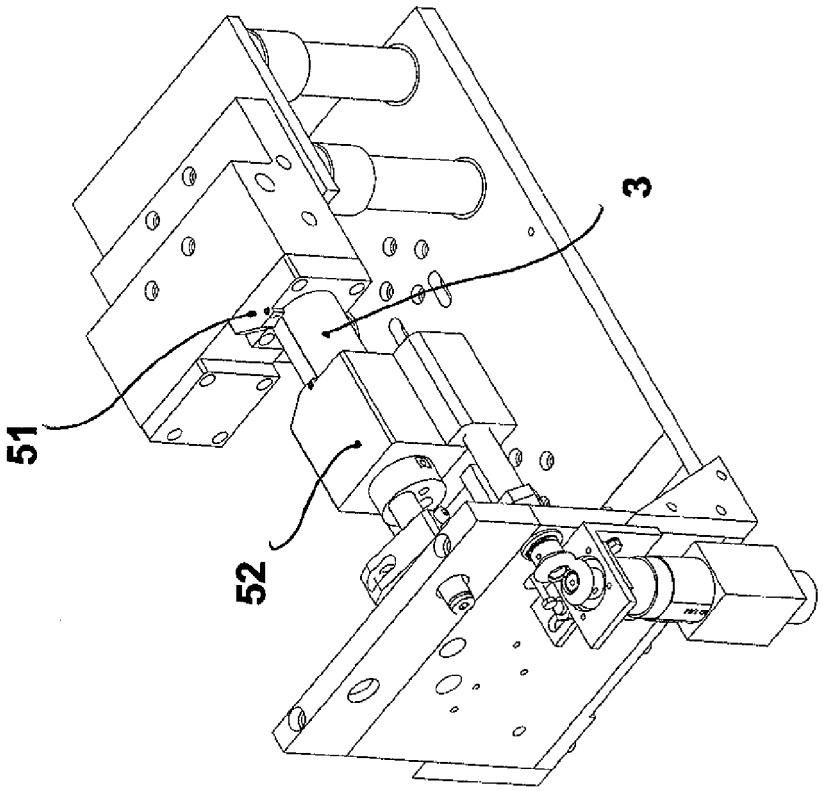

Fig. 1a

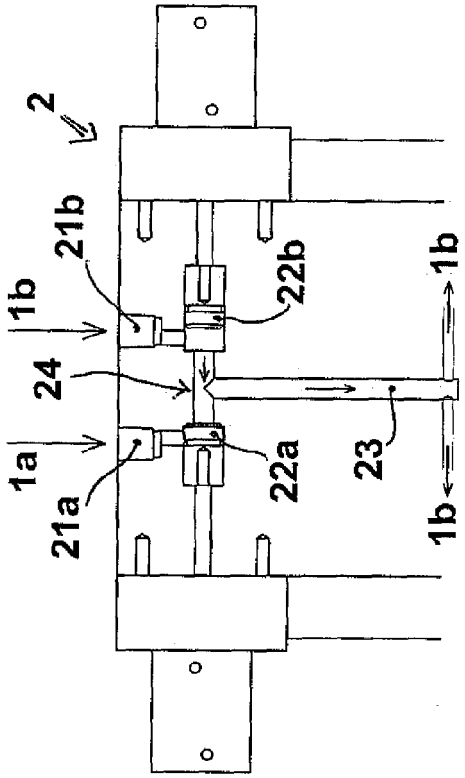

Fig. 4

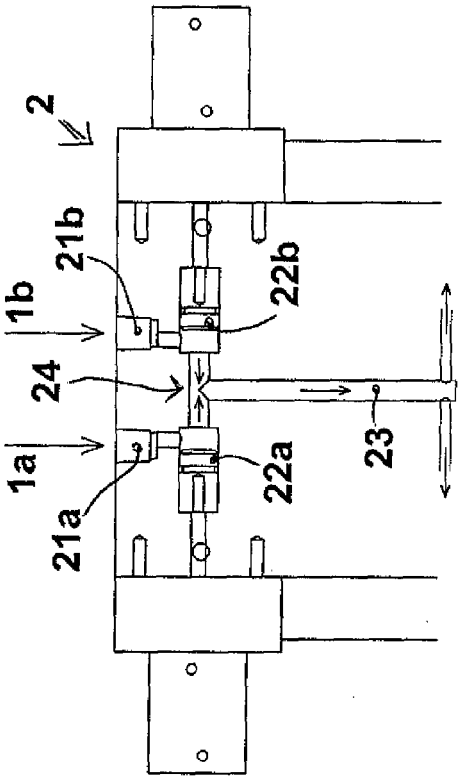

Fig. 6

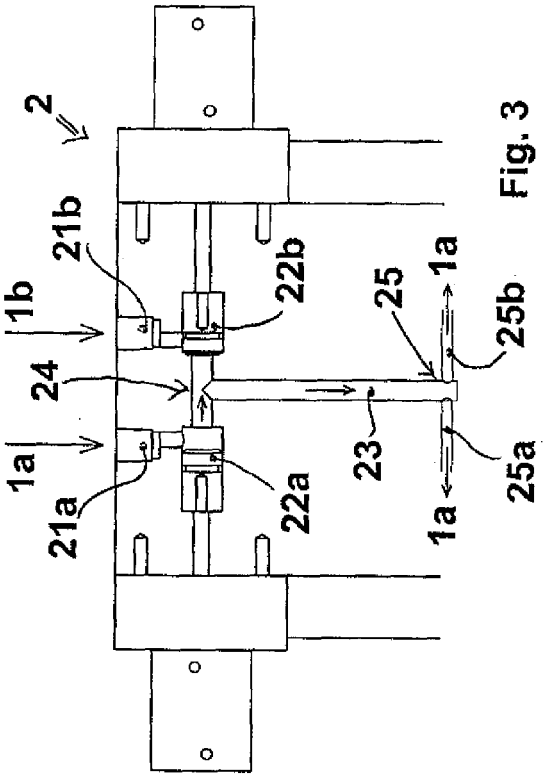

Fig. 3

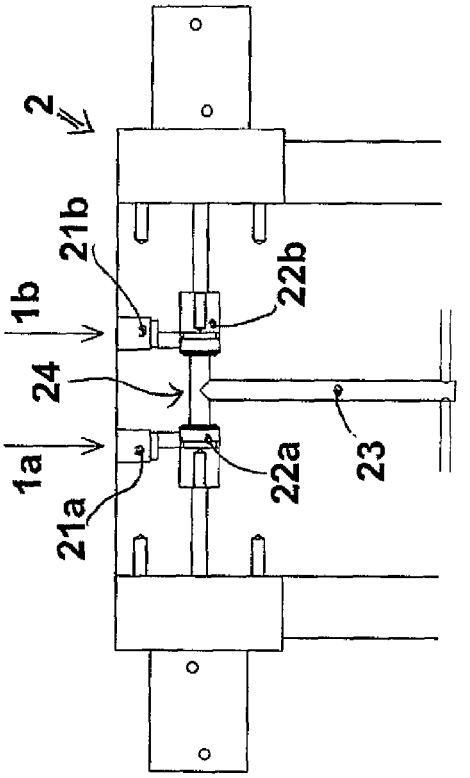

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 09 16 1233

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2006/102783 A (SOGNO AG [CH]; BALTENSPERGER WALTER [CH]) 5 October 2006 (2006-10-05) * page 7, line 26 - page 11, line 2; figures *	1-4	INV. B42C9/00 B42C19/02
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 October 2009	Louvion, Bernard

CATEGORY OF CITED DOCUMENTS

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30-10-2009

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