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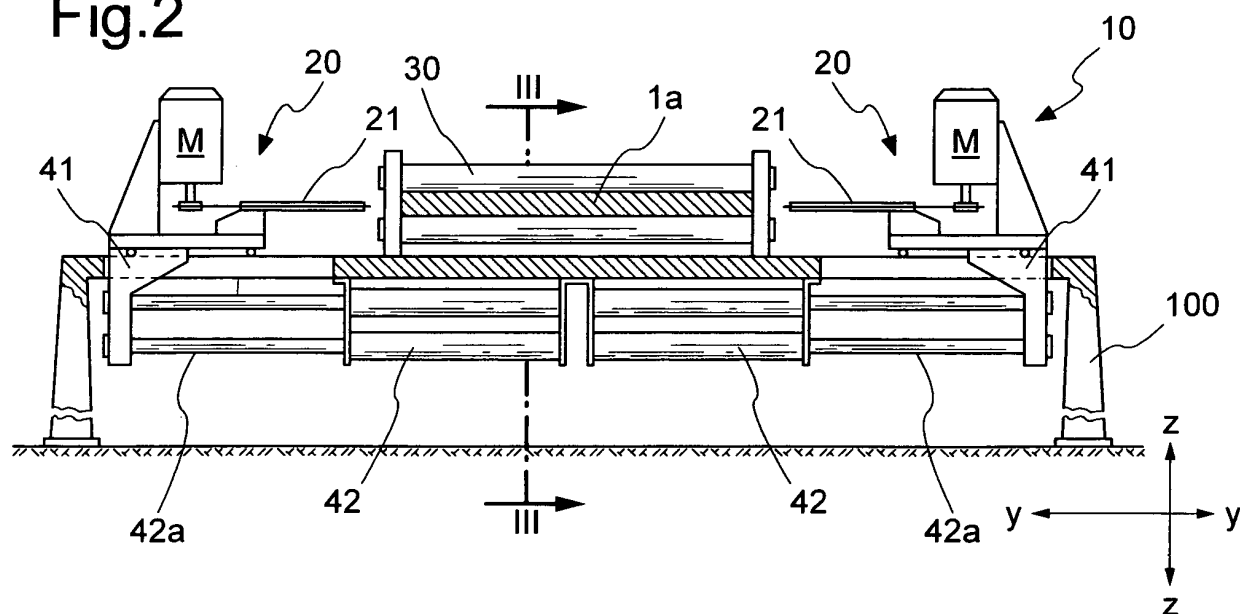
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(54) **Mitten manufacturing machine with devices for impregnating said mittens**

(57) Machine from manufacturing mittens (1), comprising a device (10) for supplying a strip (1a) of suitable material, in strip form, in a longitudinal direction (X-X), at least one cutting device (20) displaceable, in both sens-

es, along a transverse direction (Y-Y) perpendicular to the direction of feeding of the strip (1a), for performing a cut inside the said strip, said cutting devices (20) comprising means (120) for supplying a detergent (120a) to the strip (1a) of material during cutting of the mitten.

Fig.2



Description

[0001] The present invention relates to a machine for manufacturing a mitten, in particular of the hygienic/sanitary type, comprising detergent supplying means associated with means for cutting the mitten.

[0002] It is known that, in the hygiene/sanitary sector, there exists the need to use mittens which are made of spongy material or the like and impregnated with a dry detergent, to be wetted at the time of use, these mittens being used, for example, for washing bed-bound patients.

[0003] In particular, the document WO99/00226 describes known mittens which are designed for this purpose and are formed as a single body made of material which can be impregnated, but has a high friction characteristic, and therefore reduces the possibility of a user being able to extract his/her hand from the mitten. Said mitten has a one-piece body in the thickness of which a cut is performed, said cut separating two facing walls of the mitten and forming an opening through which the user can introduce his/her hand inside the mitten.

[0004] Said patent also discloses a machine from manufacturing these mittens, comprising a device for supplying a strip of material in a feeding direction and towards cutting devices which are displaceable, in both senses, along a direction perpendicular to the direction of feeding of the strip, for performing a cut inside the said strip, and cutting means for defining the external perimeter of the mitten and for separating it from the strip.

[0005] Although fulfilling its function, this machine has several drawbacks arising from the fact that it must be supplied with a strip of material already impregnated with dry detergent; this means that the strip must be soaped beforehand with liquid detergent and then dried before being able to be cut in order to form the mitten.

[0006] This prior processing of the mitten results in the need to provide the associated apparatus, corresponding processing areas and intermediate storage facility, with a consequent increase in the cost of production of the finished product.

[0007] The technical problem which is posed, therefore, is to provide a mitten manufacturing machine which is able to solve the abovementioned problems of the prior art and avoid prior processing of the strip of material to be cut.

[0008] In connection with this problem it is required that the machine should be able to ensure a higher productivity compared to the prior art and be able to be managed by a smaller number of operating personnel.

[0009] These problems are solved according to the present invention by a machine from manufacturing mittens, comprising a device for supplying a strip of suitable material, in strip form, in a longitudinal direction, at least one cutting device displaceable, in both senses, along a transverse direction perpendicular to the direction of feeding of the strip, for performing a cut inside the said strip, said cutting means comprising means for supplying

a detergent to the strip of material during cutting of the mitten.

[0010] Further details may be obtained from the following description of a non-limiting example of embodiment of the invention provided with reference to the accompanied drawings, in which:

Figure 1 shows a partial plan view of the mitten manufacturing machine according to the present invention;

Figure 2 shows a schematic cross-section along a plane indicated by II-II in Fig. 1;

Figure 3a shows a schematic cross-section along a plane indicated by III-III in Fig. 2;

Figure 3b shows a schematic cross-section, similar to that of Fig. 3a, of a second embodiment of the means for retaining the strip to be cut;

Figure 4 shows a plan view of the cutting device of the machine according to Fig. 1;

Figure 5 shows a cross-section along the plane indicated by V-V in Fig. 4;

Figure 6 shows a cross-section along the plane indicated by VI-VI in Fig. 4;

Figure 7 shows a cross-section along the plane indicated by VII-VII Fig. 6.

[0011] As shown in Fig. 1 and with reference to a set of three reference axes assumed conventionally as being a longitudinal axis X-X, a transverse axis Y-Y and a vertical axis Z-Z in the directions shown in the figures, the machine according to the invention for producing hygienic/sanitary mittens 1 comprise a conveying device 10 formed by a conveyor belt 11 endlessly wound around associated drive rollers 11a, at least one of which is actuated by a motor 11b.

[0012] The strip 1a of material, for example spongy material, is positioned on the said belt 11 so as to be conveyed opposite the cutting station 20 for performing the cut inside the mitten 1.

[0013] Said cutting station 20 is provided with suitable means for retaining the strip 1a, arranged transversely with respect to the direction of feeding thereof and able to retain the strip so as to prevent undesirable movements thereof during entry of the cutting blade.

[0014] In greater detail, according to a first embodiment shown in Figure 3a, said retaining means 30 comprise a belt 31 wound endlessly around two rollers 31a, at least one of which is motor-driven; the axis of the rollers 31a lies in a plane situated parallel to and above the plane which contains the belt 11 for conveying the strip 1a.

[0015] The belt 30 for retaining the strip is situated at a distance from the conveyor belt 11, which can be adjusted by suitable means, for example screw-type means (conventional per se and therefore not shown), so as to achieve sufficient pressure in relation to different thicknesses of the strip of material to be cut.

[0016] According to a further embodiment (Fig. 3b), said retaining means 130 comprise at least one pressing

device 131 with external dimensions such as to define the surface of a mitten 1 and internally hollow so as to allow entry of the cutting means described below.

[0017] In this case also, the retaining means 130 are associated with corresponding means (not shown) for moving and adjusting the end-of-travel position in accordance with the different thicknesses of the strip to be cut.

[0018] According to preferred embodiments, said pressing devices may be provided with cutting edges in order to perform punching of the mitten so as to allow easy separation thereof at the outlet of the machine.

[0019] The cutting device 20 essentially consists of a circular blade 21 provided with a central hole 21a and holes 21b arranged along an inner circumference of the cutting edge 21c.

[0020] Said holes 21b are able to receive screws 22b for fixing the blade 21 to an idle pulley 23 engaged with a corresponding belt 28a closed around actuating means (conventional per se and therefore not shown) consisting, for example, of the shaft of a motor M.

[0021] The blade 21 also has a central hole 23a housing a bearing 24 keyed onto a pin 25 provided with a coaxial threaded hole 25a, for engagement with a corresponding locking screw 26a which passes through a hole formed in a cover 26b of a wedge-shaped half-shell 26.

[0022] Said screw 26a has a coaxial, inner, female thread suitable for mating with a corresponding screw 27a, the head of which reacts against a counter-shell 27 which thus forms the support element for the blade 21 and which has a form which is symmetrical with the half-shell 26 relative to the blade 21.

[0023] As shown in the Figs. 5 and 6, the cutting device comprises means 120 for supplying a detergent 120a; said means 120 comprise a pair of ducts 121 extending in the longitudinal direction of the cutting means and provided with a respective inlet opening 122 which opens out on the half-shell 26 of the said means; said ducts 121 also have a series of outlet holes 123 which open out in suitable positions on the said shell 26.

[0024] In this way it is possible to supply to the tool 21 a suitable fluid detergent which impregnates the strip 1a of material and therefore the mitten 1, during cutting, acting at the same time as a lubricant preventing sticking of the blade 21 during cutting of the mitten. Preferably, the outlet holes are arranged with a variable interaxial distance which decreases towards the cutting blade.

[0025] According to a preferred embodiment the machine comprises a plurality of cutting devices 20 which are arranged symmetrically with respect to the direction of feeding of the strip 1a and along the opposite sides of the said strip.

[0026] The cutting devices 20 (Fig. 1) are fixed to the slides 41, movable in a transverse direction towards/away from the strip 1a by means of the recall/thrusting action of a pair of rods 42a of respective cylinders 42 which are fixed to the frame 100 of the machine in the cutting station.

[0027] With this configuration it is possible to reduce

considerably the overall dimensions of the machine, in particular in the direction Y-Y so that a single operator can easily manage from a single working position loading/unloading of the machine.

[0028] The operating principle of the machine is as follows:

- once the strip 1a of material has been supplied to the cutting station 20, the devices 30;130 for holding the strip in position are activated and rotation of the blade 21 is started and the cylinders 42 are activated so as to recall the facing slides 41 towards the strip 1a where the blades 21 penetrate over a section of predetermined length corresponding to the depth of the pocket to be formed;
- once the internal cut has been performed, the blade 21 is withdrawn by the cylinders 42 so as to release it from engagement with the strip 1a;
- the strip is fed forwards by means of the conveyor belt 11 along a section corresponding to the programmed width of the mitten 1 so as to convey the part, already cut internally, to the outlet;
- the said external perimeter cutting devices are activated while at the same time the internal cutting device 20 penetrates into the strip section 12 positioned opposite the said device by the previous feeding movement so that it is possible to perform simultaneously the two - internal and external - cuts.

[0029] Although a preferred embodiment has been described many constructional variants of the various machine components are possible, in particular as regards the working sequence which may be reversed, performing firstly external perimetral cutting of the strip in order to form the individual mittens and then internal cutting in order to form the pocket; by way of an alternative it is also possible to envisage that the two cuts may be performed simultaneously in each cutting station.

[0030] Furthermore, should the transverse dimension of the pocket be greater than the diameter of the blade 21, the latter may be also displaced in a direction perpendicular to the direction of entry into the material so as to allow execution of a cut which has the same depth but a width which may be programmed as required.

[0031] Although not shown, it is also possible for the detergent supplying device to be replaced by a pipe having nozzles arranged immediately upstream and downstream of the cutting station 20; in a preferred embodiment, said nozzles are adjustable so as to determine a suitable supply flow rate related also to the feeding speed.

[0032] It is therefore clear how with the machine according to the invention it is possible to produce finished impregnated mittens without the need for prior processing of the strip of material supplied to the cutting machine. In addition, the particular embodiment of the cutting devices is such that the production may be managed by a single operator remaining stationary in a single working

position.

Claims

1. Machine from manufacturing mittens (1), comprising a device (10) for supplying a strip (1a) of suitable material, in strip form, in a longitudinal direction (X-X), at least one cutting device (20) displaceable, in both senses, along a transverse direction (Y-Y) perpendicular to the direction of feeding of the strip (1a), for performing a cut inside the said strip, **characterized in that** said cutting devices (20) comprise means (120) for supplying a detergent (120a) to the strip (1a) of material during cutting of the mitten.
2. Machine according to Claim 1, **characterized in that** said means (120) for supplying a detergent (120a) comprises a pair of ducts (121) extending in the longitudinal direction of the cutting means (20) and provided with a respective inlet opening (122) and a series of outlet holes (123) which open out in suitable positions on the said cutting means (20).
3. Machine according to Claim 2, **characterized in that** the interaxial distance of the outlet holes (123) for the detergent (120a) is variable.
4. Machine according to Claim 3, **characterized in that** the interaxial distance of the outlet holes (123) for the detergent (123a) decreases towards the cutting blade (21).
5. Machine according to Claim 1, **characterized in that** said conveying device comprises a conveyor belt (11) which is endlessly wound around associated drive rollers (11a), at least one of which is actuated by a motor (11b).
6. Machine according to Claim 1, **characterized in that** said cutting device (20) essentially consists of a circular blade (21) provided with a central hole (21a) and holes (21b) arranged along an inner circumference of the cutting edge (21c) and suitable for mating with corresponding screws (22b) for fixing the blade (21) to an idle pulley (23) engaged with a corresponding belt (28a) closed around associated actuating means (M).
7. Machine according to Claim 1, **characterized in that** it comprises a plurality of cutting devices (20) which are arranged symmetrically with respect to the direction of feeding of the strip (1a) and along the opposite sides of the strip.
8. Machine according to Claim 1, **characterized in that** the cutting devices (20) are fixed to associated slides (41) which are displaceable in the transverse

direction towards/away from the strip (1a) by means of the recalling/thrusting action of corresponding actuating means (42, 42a).

9. Machine according to Claim 8, **characterized in that** said means (42, 42a) for actuating the slides (41) of the cutting devices are arranged below the means (11) for conveying the strip (1a) into the cutting station (20).
10. Machine according to Claim 8, **characterized in that** said actuating means consist of a pair of rods (42a) of respective cylinders (42) which are fixed to the frame (100) of the machine.
11. Machine according to Claim 1, **characterized in that** it comprises means (30;130) for retaining the strip (1a) which are arranged transversely with respect to the direction of feeding thereof and are able to retain the strip during cutting.
12. Machine according to Claim 11, **characterized in that** said retaining means (30) comprise a belt (31) which is wound endlessly around two rollers (31a), at least one of which is motor-driven.
13. Machine according to Claim 12, **characterized in that** the axis of the rollers (31a) lies in a plane situated parallel to and above the plane which contains the belt (11) for conveying the strip (1a).
14. Machine according to Claim 13, **characterized in that** the belt (31) for retaining the strip is arranged at a distance from the conveyor belt (11), which can be adjusted by suitable means depending on different thickness of the strip of material to be cut.
15. Machine according to Claim 12, **characterized in that** said retaining means (130) comprise at least one pressing device (131) with external dimensions such as to define the surface of a mitten (1) and internally hollow so as to allow introduction of the cutting means (20).
16. Machine according to Claim 15, **characterized in that** said retaining means (130) are associated with corresponding means for adjusting the end-of-travel position in accordance with the different thicknesses of the strip to be cut.
17. Machine according to Claim 15, **characterized in that** said retaining means (130) have cutting edges for performing punching of the mitten during the cutting operation.
18. Machine according to Claim 1, **characterized in that** said means for supplying a detergent comprise a pipe provided with nozzles arranged immediately

upstream and downstream of the cutting station.

19. Machine according to Claim 18, **characterized in that** said nozzles are of the adjustable type so as to determine different supply flow rates.

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Fig.1

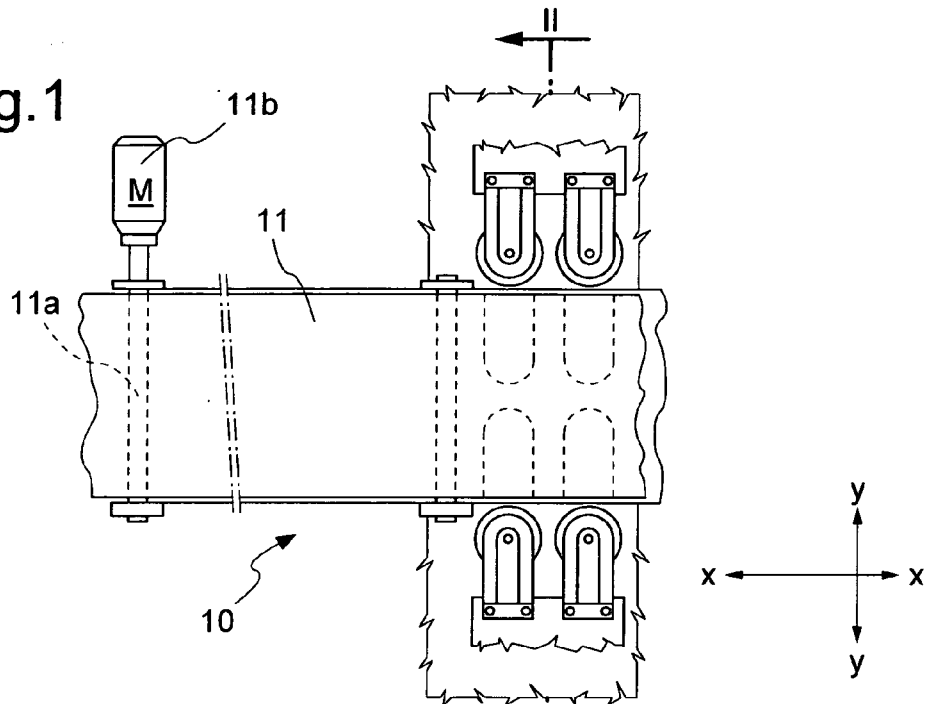


Fig.2

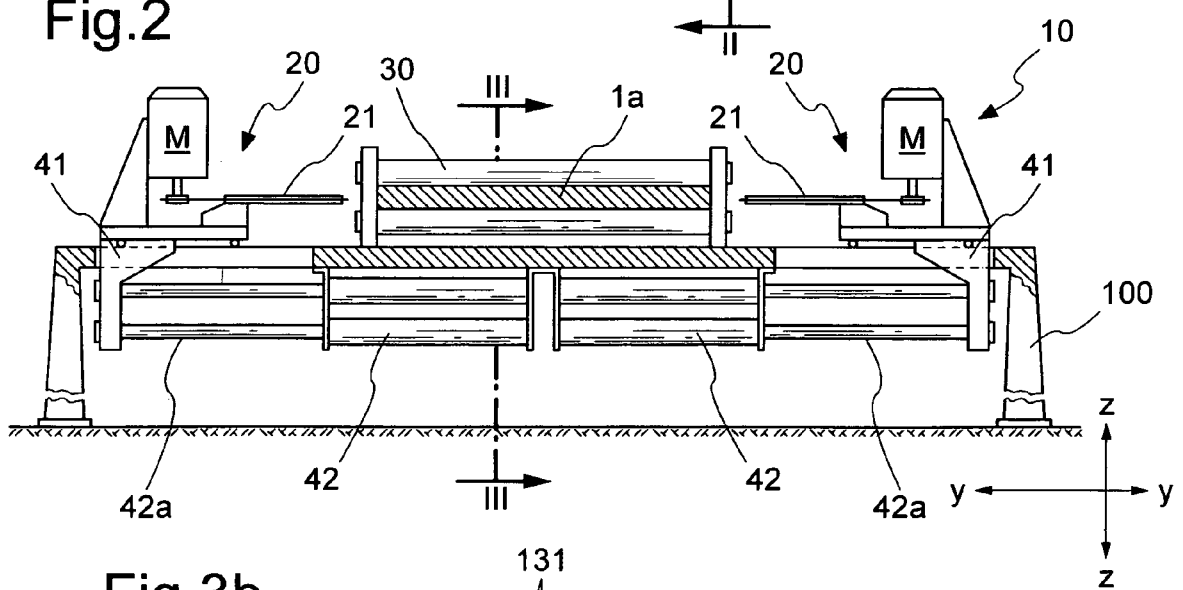


Fig.3b

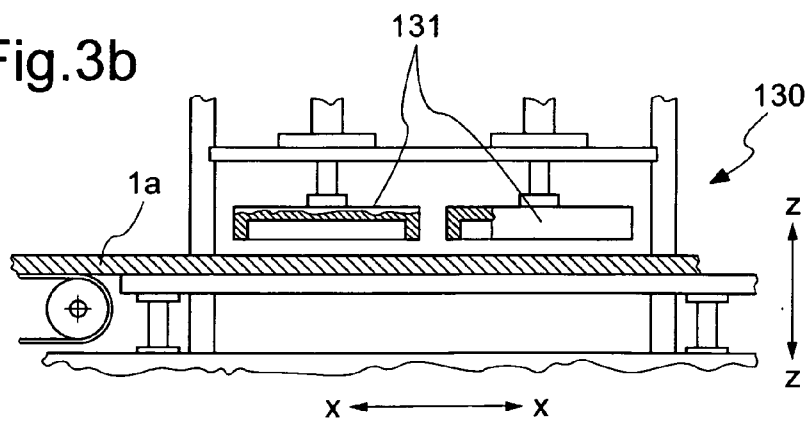


Fig.3a

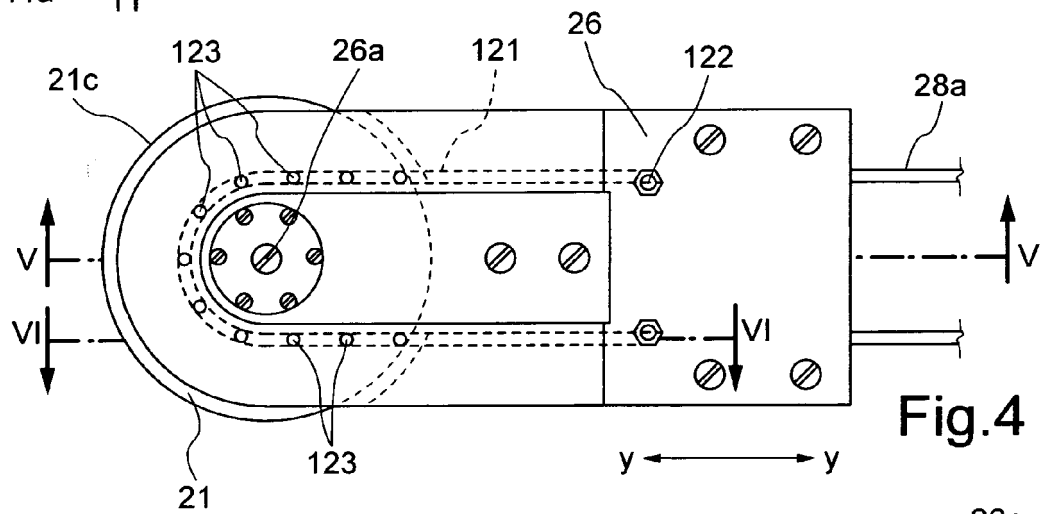
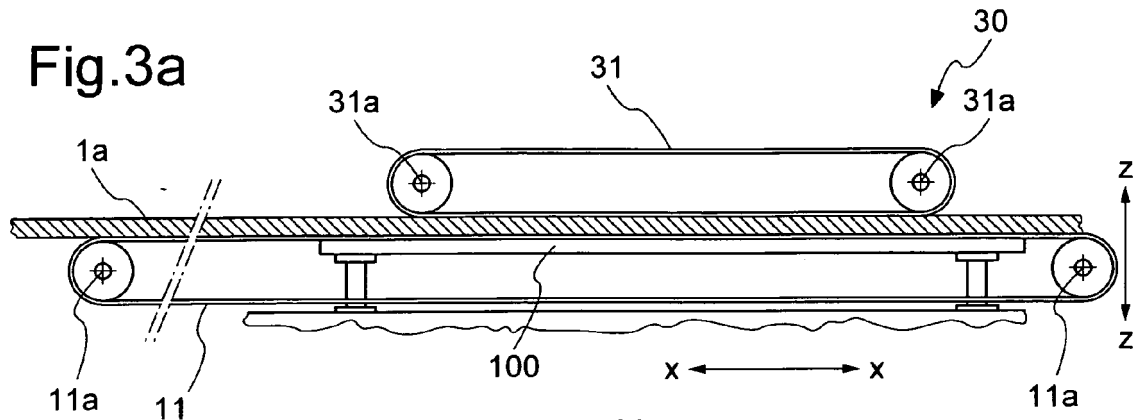


Fig.4

Fig.5

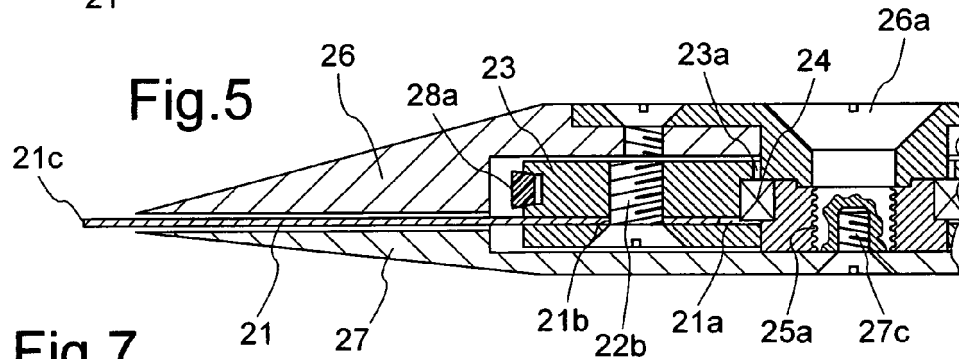


Fig.7

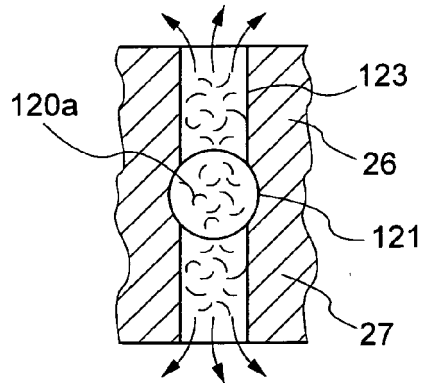
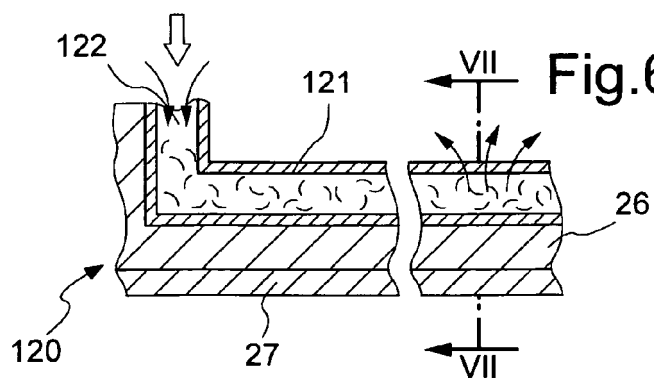


Fig.6





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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 Munich		Date of completion of the search 11 June 2008	Examiner Canelas, Rui
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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11-06-2008

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