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(54) The method of heat sealing of footwear uppers with vapour permeable membrane and the device to be used for heat sealing in accordance with this method

(57) The method consists in the following points: the membrane (2) prepared for heat sealing is inserted into the upper (1), the both elements are positioned to each other and preliminarily heat sealed together in at least one area (35); then the upper (1) prepared in this manner with membrane (2) is inserted onto a heating and holding down member (5) provided with expendable reservoir (12) enabling the pressure of its external skin onto the inner surface of the membrane (2) as a result of the pumping of gas into the reservoir (12) under the pressure not higher than 0,1 MPa; while the extendable skin of the reservoir (12) is heated up to the temperature not higher than 200°C and the pressure of this hot skin of the reservoir (12) onto the membrane surface is maintained during the period required for the activation of thermosetting adhesive and its penetration to the contacting layers of the upper (1) and membrane (2). The device consists of the support structure (3) with the plate (4), the heating and holding down stem (5) installed on the plate (4), pressure reducer (6) with the valve (7) and temperature controller (8); wherein the heating and holding down stem (5) incorporates the core (9) fastened to the plate (4) and incorporating: the heater (10) and temperature sensor (11) connected with electric temperature controller (8); on its side surface, the core (9) is provided with inserted flexible and extendable reservoir (12) with at least one opening (13) the boundary of which is fastened on the surface of this core (9) in a tight manner. The core (9) incorporates an opening (14) to be used for the supply of compressed gas to the extendable reservoir (12) from the compressed gas source via pressure reducer (6) and valve (7). The shape of the core (9) is almost cylindrical and the reservoir (12) is made of the material resistant to the impact of increased temperature of up to 200°C. There are variant solutions of the core (9) in the scope of the fastenings of reservoir (12) completed also in variant design solutions.

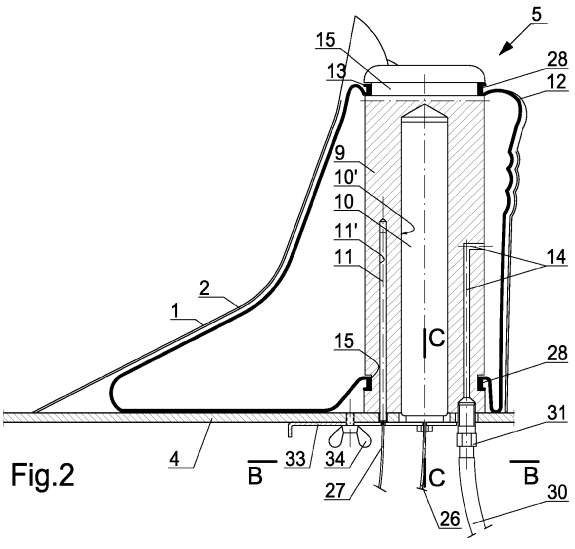

Fig.2

EP 2 353 421 A1

Description

[0001] The method of heat sealing of footwear uppers with vapour permeable membrane and the device to be used for heat sealing in accordance with this method.

[0002] The subject of this invention is the method of heat sealing of footwear uppers with vapour permeable membrane and the device to be used for heat sealing in accordance with this method.

[0003] The purpose of heat sealing of these elements is to ensure the water-tightness of footwear semi - product in the form of the upper consisting of pieces of leather sewn together. The water - tightness and vapour permeability is achieved by means of at least one vapour permeable membrane fastened on the inner surface of the upper i.e. the membrane enabling the vapour penetration in one direction only - outwards. One surface of the membrane i.e. the surface contacting with leather is provided with thermosetting adhesive applied in the form of a pattern. The elements being integrated are permanently welded together as a result of their compression together during certain period of time at increased temperature ensuring the activation of the adhesive.

[0004] There is a known applied method of heat sealing of footwear uppers with vapour permeable membrane which consists in spreading out of the footwear upper with its inner surface upwards, on the support of the device for heat sealing. The vapour permeable membrane is laid upon the surface of spread upper with its side coated with adhesive toward the membrane until its contact with the surface of the upper. The both elements are positioned precisely in relation to each other and compressed together by means of the clamp provided with actuator. In course of the compression of elements being sealed together, the heat propagating from the hot clamp activates the thermosetting adhesive penetrating into the layers of elements to be integrated and leads to their bonding together.

[0005] There is a known applied device for heat sealing of elements constituting the components of the footwear upper with their corresponding membranes. This device incorporates the individual stands fastened to the common support structure plate and characterized by the shape and dimensions adapted to the specified three - dimensional element of the upper. Each of these stands is provided with the column fastened on the plate; said column is provided with guide with sliding brackets: the lower bracket with the support representing three - dimensional shape of an element and upper bracket with the clamp adapted to this bracket and equipped with an actuator. The support or clamp or the support and clamp incorporate the heaters, principally electrical heaters in order to enable their heating up to required temperature. The heat sealing process is carried out when the elements to be heated are compressed together by means of the clamp. In order to enable the heat sealing of all elements, the upper is laid onto the supports of successive stands of this device.

[0006] EP1635665 patent contains the description of the process and machine used to ensure the water-tightness of the footwear, clothing and accessories semi - product as well as the description of semi - product in the form of product obtained by means of aforesaid process or machine. Presented machine is provided with pressing device incorporating with at least one pair of deformable plates incorporating the body with longitudinal opening; the pressing surface of the body is flexible and suitable for pushing out outwards by the pressurized liquid. The deformable plates are fastened on the support structure in a manner enabling their rotation in order to open or close the pressing device around formed bracket to be used for the positioning of aforesaid semi - product during pressing process with at least one coat ensuring the water tightness. The pressing device as well as formed bracket are provided with heating assemblies dedicated for activation of the thermosetting adhesive layer applied between the elements being integrated. The formed bracket consists of movable members which can be displaced from each other to enable the change of its dimensions and adaptation to the uppers with diversified dimensions. Furthermore the bracket is provided with transport assembly ensuring its displacement along the rail to the pressing device.

[0007] The heat sealing process carried out on aforesaid machine consists in the insertion of the upper turned inside out and in the insertion of water resistant coat cut to the dimension of inner surface of the upper thereafter. This coat is heat sealed in this condition after the application of boundary edges on each other. In this condition, the formed bracket with applied semi-product is transported to the pressing device area where the water resistant coat is subjected to the pressure of the hot pressing surface. During this time, the thermosetting adhesive layer applied between the elements being integrated is activated as a result of the impact of pressurized hot air supplied inwards under the pressing surface and the elements are integrated together. After predetermined time, the pressing device is opened and integrated semi - product is transported together with formed bracket to the initial position where this semi - product is removed from the bracket and the next prepared semi - product inserted onto another formed bracket moving along another rail is transported to the pressing device area.

[0008] The essence of the invention consists in the method of heat sealing of footwear upper with vapour permeable membrane; wherein the upper consists of the pieces of leather, leather imitating material or textile material sewn together and forms a coat with closed sides and with three - dimensional configuration with human foot shape and wherein a vapour permeable membrane to be heat sealed with the inner surface of the upper, consists of at least one element made of elastic textile material is cut out in the shape of the inner surface of the upper and is spread with its two edges overlapping and enabling their heat sealing together; characterized in that the membrane prepared for heat sealing is inserted into

the upper, the both elements are positioned to each other and preliminarily heat sealed together in at least one area wherein the upper and the membrane can be spread without any folds and wrinkles on supporting surface. The preliminary heat sealing is carried out on the known device incorporating the bracket with supporting surface and the clamp heated to required temperature and used to compress the elements to be integrated together. The upper prepared in this manner with preliminarily heat sealed membrane is inserted onto a heating and holding down member provided with expendable reservoir enabling the pressure of its external skin onto the inner surface of the membrane as a result of the pumping of gas into the reservoir under the pressure not higher than 0,1 MPa. During this time the extendable skin of the reservoir is heated up to the temperature not higher than 200°C and the pressure of this hot skin of the reservoir onto the membrane surface is maintained during the period required for the activation of thermosetting adhesive and its penetration to the contacting layers of upper and membrane.

[0009] The essence of the invention is also the device used for the heat sealing of footwear uppers with vapour permeable membrane and incorporating the support structure with the plate, characterized in that it incorporates the heating and holding down stem installed on the plate, pressure reducer with valve and temperature controller. The heating and holding down stem applied for the insertion of the upper with the membrane placed inside for their heat sealing together, incorporates the core fastened to the plate; wherein said core incorporates: the heater and temperature sensor connected with electric temperature controller. On its side surface, the core is provided with inserted flexible and extendable reservoir with at least one opening the boundary of which is fastened on the surface of this core in a tight manner. The core incorporates an opening to be used for the supply of compressed gas from the compressed gas source via pressure reducer and valve.

[0010] As a result of compressed air supply to extendable reservoir, the latter is filled and causes the pressure exerted onto the surface of membrane spread on the inner surface of the upper and the heating and holding down stem is heated to the temperature required to ensure the correct heating of the elements to be integrated together: upper and membrane. The pressure parameters in the reservoir required to achieve required values of pressures onto the membrane and equivalent pressures exerted by the membrane onto the upper as well as the values of temperature required for adhesive bonding process are established by means of pressure reducer and temperature controller.

[0011] The shape of the core is almost cylindrical and the flexible and extendable reservoir situated on the core is made of the material resistant to the impact of increased temperature of up to 200°C. Favourably, the reservoir is made of rubber resistant to the impact of operation in increased temperature.

[0012] On its side cylindrical surface, the core incorporates the groove in its lower or upper part or with two grooves i.e. one grove situated in the lower and another in upper part of the core. The circumference of the opening of extendable reservoir is laid in the groove and crimped by means of band clip in order to increase the tight fastening reliability.

[0013] In its variant solution, the core is provided in its lower part with an offset with reduced diameter and with pressure ring located thereon.

[0014] In its another variant solution, the core is provided in its upper part with an offset with reduced diameter and with a strap located thereon, said strap is fastened on the core by means of screws.

[0015] In its successive solution, the core is provided in its upper part with an attachment fastened on the core by means of screws.

[0016] The reservoir installed on the core is characterized by the shape similar to the section of cylindrical tube with the openings on the both ends. In its another solution, the reservoir is characterized by the shape similar to the cylinder or three - dimensional body representing the shoe upper. The faces of the reservoir i.e. lower and upper surface of the reservoir are formed as the flat or conical surfaces incorporating the openings enabling the insertion of the reservoir onto the core.

[0017] The circumference of the opening of the reservoir inserted onto core, in its lower part, is fastened on this core in a tight manner.

[0018] In the first case, the circumference of the opening of the reservoir is fastened on the core, in its lower groove by means of band clip for crimping.

[0019] In its variant solution, the circumference of the opening in the lower surface of reservoir is inserted onto the offset on the core; wherein the pressure ring is depressed and tight connection is achieved as a result of the fastening of the core on the plate.

[0020] The circumference of the opening in the upper surface of reservoir is fastened on the core in its upper groove in a manner identical to the lower groove.

[0021] In its variant solution, the circumference of the opening in the upper surface of reservoir is inserted onto the offset on the core; wherein the strap is fastened to achieve the tight connection.

[0022] In its variant solution, wherein the reservoir without opening in its upper surface is applied, the tight connection is achieved after the insertion of reservoir and fastening in its lower part and fastening of the attachment in its upper part.

[0023] The fastened attachment enables the bulging of the reservoir upwards.

[0024] The method of heat sealing in accordance with the invention is characterized by several valuable advantages. Thanks to the application of an extendable reservoir with the skin after the pumping pressurized gas therein depressing onto the membrane surface, there is no need to use any lasts representing the human foot. The pressure of the reservoir skin onto the membrane surface

is exerted in an uniform manner within the whole surface area, irrespective of the size of the upper, its spatial layout and local roughness, therefore adequate pressure is ensured in each location and consequently, the correct heat sealing of the upper and membrane. Furthermore there is no need to turn the upper and membrane inside over. After their sealing together, the upper and membrane constitute the semi - product to be used for further assembling of footwear without any additional actions.

[0025] Furthermore the heating and holding down stem heated up to adequate temperature, is characterized by almost stabilized temperature due to the fact that said stem is located inside of the upper inserted thereon while the pressure is exerted and due to the fact the removal of integrated upper and insertion of the new one for heat sealing is carried out within extremely short period of time. The heat leakage and consequently the heat losses are insignificant. The correct temperature required for heat sealing process is maintained during the whole process in a stable manner.

[0026] Also the device in accordance with the invention is characterized by several advantages. Principally, its construction is very simple, therefore the device is widely used in the production of uppers in lower quantities but it can be also easily applied in automated production line in long run production. As a result of the incorporation of the heater inside the core with a pressure reservoir with flexible and extendable skin inserted thereon in a tight manner, the temperature of the whole heating and holding down stem consisting of aforesaid elements is maintained on required level ensuring the correct heat sealing.

[0027] The subject of the invention is illustrated in the embodiment examples in the drawing, wherein:

Fig. 1 illustrates the view of the device from the side of operator;
Fig. 2 illustrates, in cross - section A-A indicated in Fig. 1, the heating and holding down stem with inserted upper in course of heat sealing process, when the reservoir is filled with compressed air,
Fig. 3 illustrates, in cross - section B-B indicated in Fig. 2, the connection and fastening of the heating and holding down stem,
Fig. 4 illustrates, in cross - section C-C indicated in Fig. 2, the fastening of the heating and holding down stem,
Fig. 5 illustrates the upper face of the core of heating and holding down stem shown in Fig. 2,
Fig. 6 illustrates, in longitudinal section, the heating and holding down stem in its variant solution,
Fig. 7 illustrates the lower face of the core of heating and holding down stem shown in Fig. 6,
Fig. 8 illustrates, in longitudinal section, the heating and holding down stem in other variant solution,
Fig. 9 illustrates the flexible and extendable reservoir made as a cylindrical tube in a perspective view,
Fig. 10 illustrates the flexible and extendable reservoir in its variant solution, made as a cylinder in a perspective view,
Fig. 11 illustrates the flexible and extendable reservoir in its variant solution, made as a cylinder with faces in conical shape in a perspective view,
Fig. 12 illustrates the flexible and extendable reservoir in its variant solution, made as a body with the shape similar to the shape of the upper interior in a perspective view,
Fig. 13 illustrates the flexible and extendable reservoir in its variant solution, made as a cylinder with the upper full face in a perspective view
Fig. 14 illustrates the footwear upper with the membrane inserted inside in the view to the upper interior, in the condition prepared for heat sealing.

Embodiment examples.

[0028] Embodiment example for the method. The parts to be sealed together are: an upper 1 consisting of leather pieces sewn together, constituting the skin closed on its sides and characterized by three - dimensional configuration with the shape of human foot as well as vapour permeable membrane 2, incorporating the thermosetting adhesive applied onto its surface to be heat sealed with inner surface of the upper 1, consisting of one element made of elastic textile material, cut out in the shape of the inner surface of the upper 1 and assembled with its two edges overlapping in the vicinity of the heel as well as heat sealed by means adhesive applied onto the surface of membrane 2. The membrane 2 prepared for heat sealing is inserted into the upper 1, the both elements are positioned in relation to each other and preliminarily heat sealed in their central front part 35 i.e. in the area in which the both assembled elements can be compressed together by means of clamps with flat surfaces without causing any folds and wrinkles. The hold down foot of the device for preliminary heat sealing is hot and the adhesive is activated by the heat released therefrom. After such preparation, the upper 1 with membrane 2 is inserted onto the heating and holding down stem 5 provided with an extendable reservoir 12 maintaining the lower edge of the upper in the contact the plate 4 of the device for heat sealing. The air with the pressure of 0,08 MPa is pumped into the reservoir 12 after the opening of valve 7; therefore the pressure of external skin of the extendable reservoir 12 is exerted onto the inner surface of membrane 2. The extendable skin of the reservoir 12 is heated to the temperature of 130°C. The pressure of hot surface of the reservoir 12 is maintained during about 30 s - the period of time required for activation of thermosetting adhesive and its penetration to the layers of upper 1 and membrane 2 contacting together.

[0029] After the lapse of determined time, the lever of valve 7 in the device of heat sealing is repositioned to its initial position and compressed air is discharged to ambient area; the upper 1 is removed together with integrated membrane 2 thereafter.

[0030] Examples of embodiment for the device.

[0031] Example I. The device consists of the support structure 3 with plate 4, the heating and holding down stem 5 installed on the plate 4, pressure reducer 6 with valve 7 and temperature controller 8. The heating and holding down stem 5 consists of the core 9 made of duralumin in the shape of cylinder with the dimensions: diameter / height equal to 80/200 up to 100/310 mm. These dimensions depend on the sizes of parts to be heat sealed together: upper 1 and membrane 2. In the example of embodiment the diameter of the core is equal to 80 mm and the height is equal to 200 mm. The core 9 is fastened to the plate 4 by means of screws 25 screwed into threaded openings 25'.

[0032] The openings 10' and 11' in the core 9 incorporate the following: heater 10 and temperature sensor 11. The electric heater 10 with the power supply voltage of 250V and power of 800W is installed in metal housing. PT-100 temperature sensor has been applied. The heater 10 and temperature sensor 11 are integrated with electric temperature controller 8 by means of the conductors 26, 27; the purpose of said controller is the setting of operation temperature of the heating and holding down stem 5. This temperature is equal to 130°C for the membranes 2 with applied adhesive. On its side cylindrical surface, in its lower and upper part, the core 9 is provided with circumferential groves 15 and the flexible and extendable reservoir 12 inserted thereon and made of cylindrical section of rubber tube resistant to the impact of temperature up to 200°C, with the diameter greater than diameter of the core 9 by 6 mm.

[0033] The thickness of the rubber wall of the reservoir 12 is equal to 2 mm. This reservoir is provided with the openings 13 in its lower and upper part and the circumferences at these openings 13 are laid in the grooves 15 in the lower and upper part of the core 9 and crimped by means of band clips 28 in a tight manner. The core 9 incorporates an opening 14 provided with a threaded seat 32 in its lower part and with outlet in its upper part; said outlet oriented toward the external surface of the core 9, is used for the supply of compressed air from the compressed air source to the extendable reservoir 12 via the pressure reducer 6, connecting conductor 29, valve 7 and flexible conductor 30 with end piece 31 screwed in the seat 32. The applied pressure reducer 6 enables the pressure reduction i.e. from air network pressure of 0,8 MPa to 0,1 MPa. The maximum pressure with this reduced value is sufficient to ensure the required pressure of membrane 2 to the upper 1 in course of heat sealing process and simultaneously is permissible owing to the tearing strength of the sewn upper. Applied valve 7 with the valve set in "ON" position causes the supply of compressed air to the extendable reservoir 12, its filling as well as hold down of the membrane 2 to the upper 1. As a result of the lever repositioning to its initial position, it is possible to discharge the compressed air from the extendable reservoir 12 to ambient area and to remove the upper with integrated membrane 2 from the heating and holding down stem 5. The components incorporated in the core 9: heater 10 and temperature sensor 11 are protected against falling out by means of lamella 33 fastened on the plate 4 by means of butterfly bolt 34.

[0034] The device is provided with, not illustrated in the drawing, protective enclosure to be inserted after the completion of work onto the heating and holding down stem 5 in order to avoid the burning in case of touching of said stem.

[0035] Example II. In its variant solution illustrated in Fig. 6, the core 9 is provided in its lower part with an offset 16 with reduced diameter and with pressure ring 17 located thereon. In the slot between faces of the offset 16 and pressure ring 17, before the fastening of the core 9 on plate 4, the circumference of the opening 13 is inserted, said opening is made in the lower face 22 of one from among variant solutions of the reservoir 12. After the fastening of the core 9 on plate 4, the circumference of the opening 13 of the reservoir 12 is integrated with core 9 in a tight manner. In its upper part the core 9 is provided with an offset 18 with reduced diameter and with strap 19 located on said offset. In the slot between faces of the offset 18 and strap 19, the circumference of upper opening 13 is inserted, said opening is made in the upper face 23 of the reservoir 12.

[0036] After the fastening of the strap 19 onto the core 9 by means of screws 20, the circumference of the opening 13 of the reservoir 12 is integrated with core 9 in a tight manner.

[0037] Example III. In the next variant solution illustrated in Fig. 8, the fastening of the reservoir 12 in the lower part of the core 9 is identical to that proposed in Example II.

[0038] In its upper part, the core 9 is provided with attachment 21 fastened by means of screws 20. After the fastening of the attachment 21 onto the core 9 by means of screws 20, the upper surface 23 of the reservoir 12 is integrated with core 9 in a tight manner. The attachment 21 enables the bulging of the reservoir 12 upwards after the compressed air supply. In this case the applied reservoir 12 in its upper face 23 is provided with the openings 24 to enable the penetration of screws 20 fastening the attachment 21.

[0039] The flexible and extendable reservoir applied in the device can be also made in various variant solutions:

Variant I. Applied in embodiment example and illustrated in Fig. 9, the reservoir 12 is characterized by the shape similar to the section of cylindrical tube with openings 13 on the both ends;

Variant II. The reservoir 12 illustrated in Fig. 10, Fig. 11 and Fig. 12 is characterized by the shape similar to cylinder or three - dimensional body representing the upper 1 with faces 22 and 23 shaped as flat of conical surfaces, incorporating the openings 13,

Variant III. The reservoir 12 illustrated in Fig. 13 is characterized by the shape identical to other variants with upper face 23, incorporating the openings 24.

Claims

1. The method of heat sealing of footwear upper (1) with vapour permeable membrane (2); wherein the upper (1) consists of the pieces of leather, leather imitating material or textile material sewn together and forms a coat with closed sides and with three - dimensional configuration with human foot shape and wherein a vapour permeable membrane (2) to be heat sealed with the inner surface of the upper (1), contains the thermosetting adhesive and consists of at least one element made of elastic textile material is cut out in the shape of the inner surface of the upper (1) and is spread with its two edges overlapping and enabling their heat sealing together; **characterized in that** the membrane (2) prepared for heat sealing is inserted into the upper (1), the both elements are positioned to each other and preliminarily heat sealed together in at least one area (35); then the upper (1) with membrane (2) prepared in this manner is inserted onto a heating and holding down member (5) provided with expendable reservoir (12) enabling the pressure of the external skin of expendable reservoir (12) onto the inner surface of the membrane (2) as a result of the pumping of gas into the reservoir under the pressure not higher than 0,1 MPa; while the extendable skin of the reservoir (12) is heated up to the temperature not higher than 200°C and the pressure of this hot skin of the reservoir (12) onto the membrane (2) surface is maintained during the period required for the activation of thermosetting adhesive and its penetration to the contacting layers of upper (1) and membrane (2).

2. The device used for the heat sealing of footwear upper (1) with vapour permeable membrane (2) and incorporating the support structure (3) with the plate (4), **characterized in that** it incorporates the heating and holding down stem (5) installed on the plate (4), pressure reducer (6) with valve and temperature controller (8), wherein the heating and holding down stem (5) incorporates the core (9) fastened to the plate (4) and incorporating: the heater (10) and temperature sensor (11) connected with electric temperature controller (8) and on its side surface, the core (9) is provided with inserted flexible and extendable reservoir (12) with at least one opening (13) circumferences of which are fastened on the surface of this core (9) in a tight manner; while the core (9) incorporates an opening (14) to be used for the supply of compressed gas to the extendable reservoir (12) via pressure reducer (6) and valve (7).

3. The device in accordance with the claim 2, **characterized in that** the core (9) has the shape similar to the cylinder.

4. The device in accordance with the claim 2 or 3, **characterized in that** the reservoir (12) is made of the material resistant to the impact of increased temperature up to 200°C.

5. The device in accordance with the claims 2 through 4, **characterized in that** the reservoir (12) is made of rubber resistant to the impact of increased temperature.

6. The device in accordance with the claims 2 through 5, **characterized in that** the core (9) on its side cylindrical surface is provided with the groove (15) in the lower or upper parts, or with two grooves (15) with one groove provided in the lower and another in the upper part of the core (9).

7. The device in accordance with the claims 2 through 6, **characterized in that** the core (9) is provided with an offset with reduced diameter (16) in its lower part and with pressure ring (17) located thereon.

8. The device in accordance with the claims 2 through 7, **characterized in that** the core (9) is provided with an offset (18) with reduced diameter and the strap (19) located thereon and fastened by means of screws (20).

9. The device in accordance with the claims 2 through 7, **characterized in that** the core (9) is provided with an attachment (21) fastened by means of screws (20).

10. The device in accordance with the claims 2 through 9, **characterized in that** the reservoir (12) has the shape similar to the section of cylindrical tube with openings (13) on the both ends.

11. The device in accordance with the claims 2 through 9 **characterized in that** the reservoir (12) has the shape similar to the cylinder or three - dimensional body representing the upper.

12. The device in accordance with the claim 11, **characterized in that** the faces (22, 23) of the reservoir (12) are formed as the flat or conical surfaces.

13. The device in accordance with the claims 11 and 12, **characterized in that** the faces (22, 23) incorporate the openings (13).

14. The device in accordance with the claims 11 through 13, **characterized in that** the upper face (23) of the reservoir (12) incorporates the openings (24).

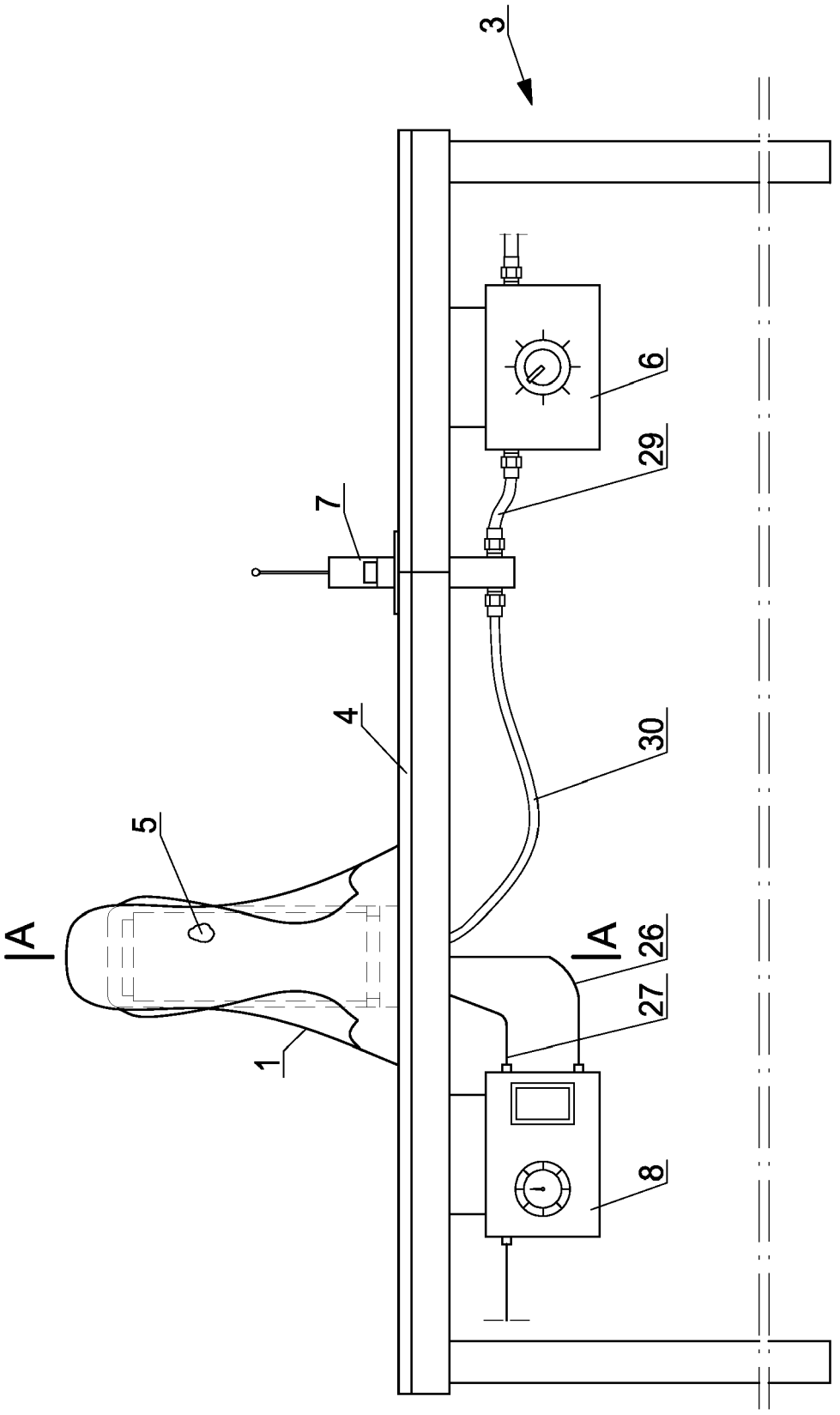

Fig.1

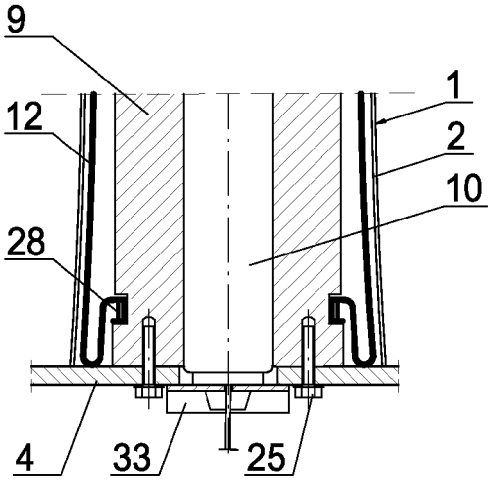

Fig.4

Fig.2

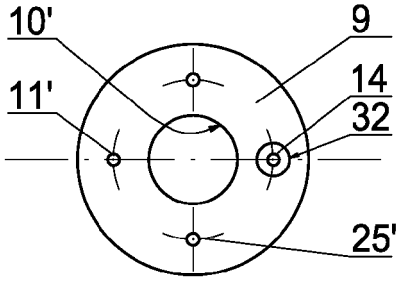

Fig.5

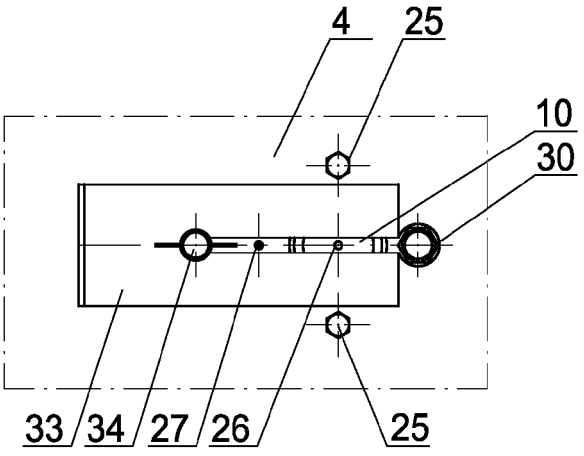

Fig.3

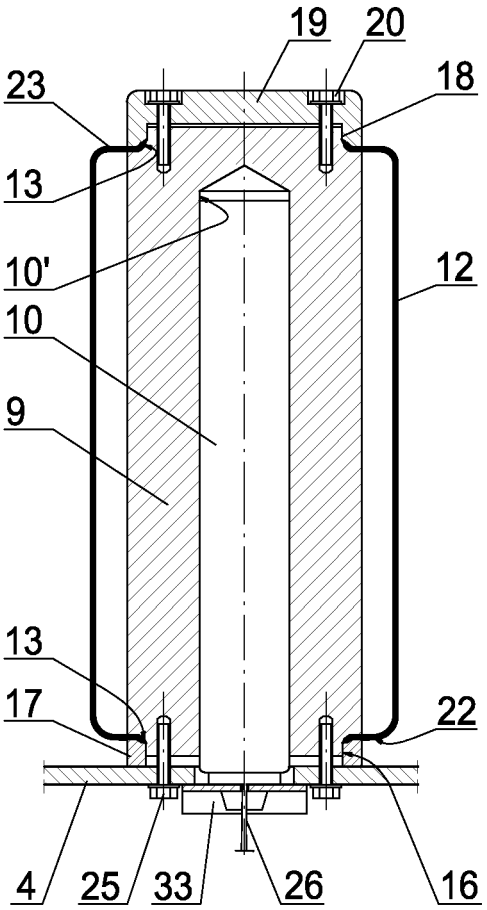

Fig.6

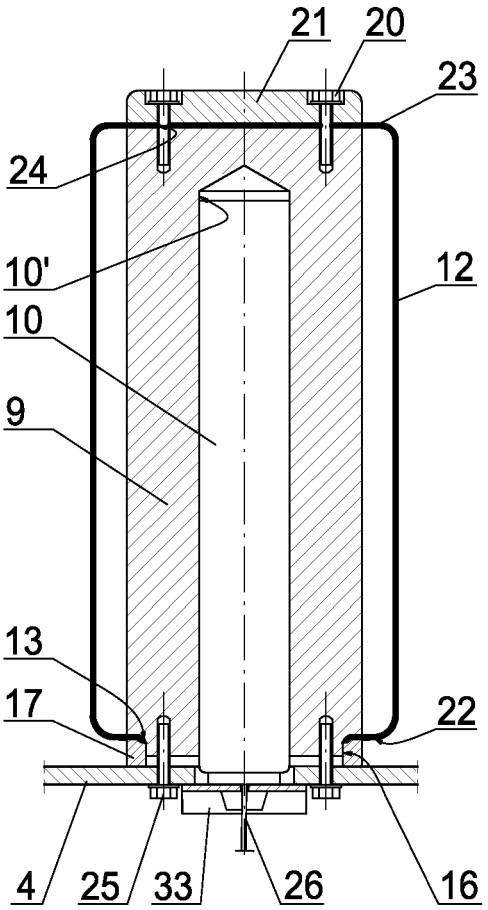

Fig.8

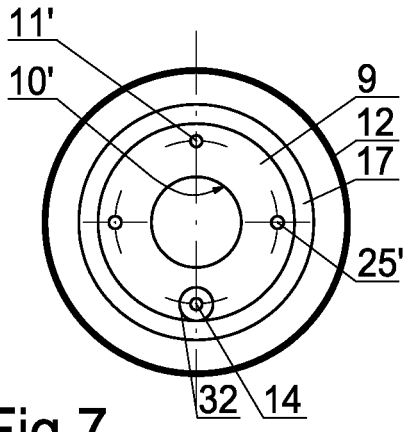

Fig.7

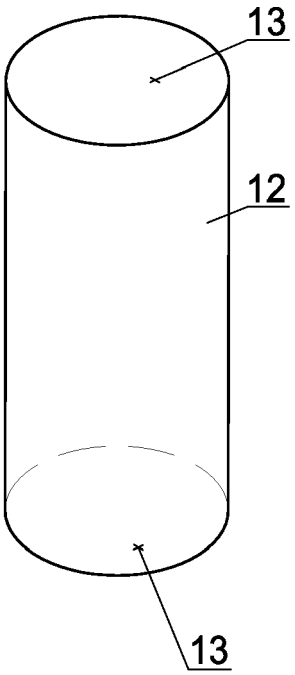

Fig.9

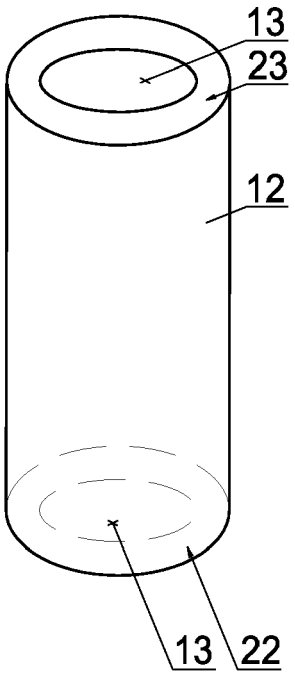

Fig.10

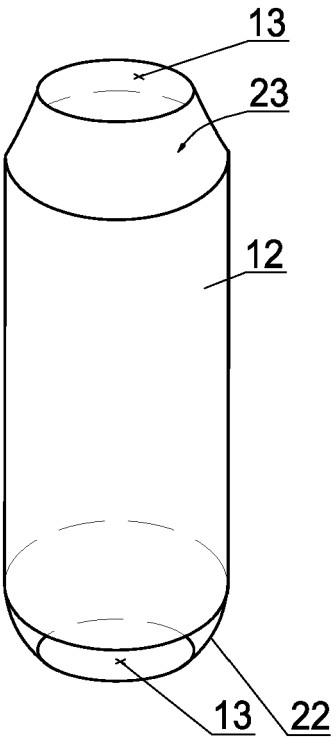

Fig.11

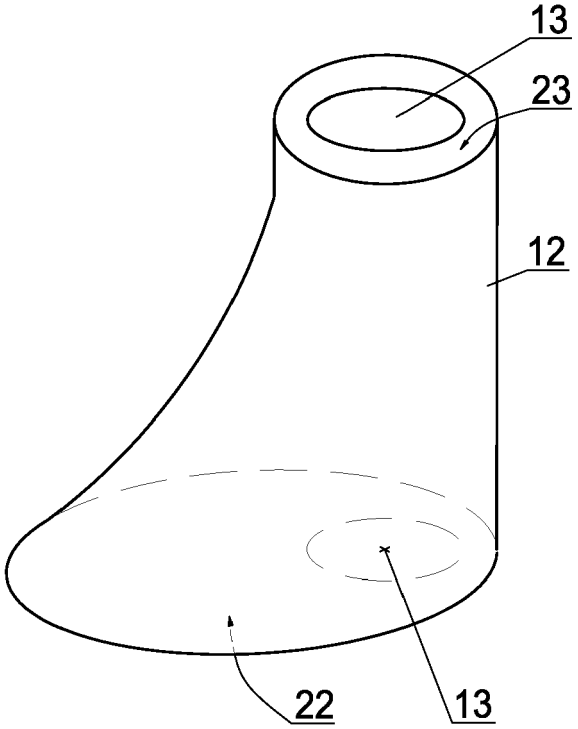

Fig.12

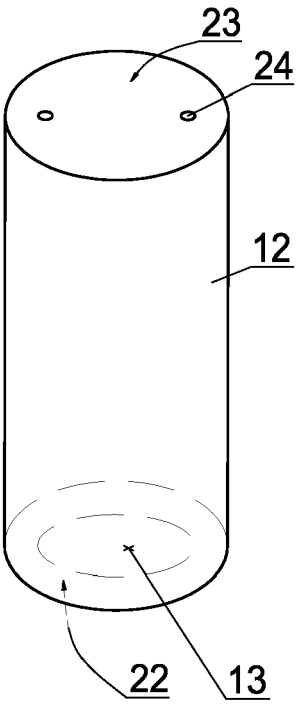

Fig.13

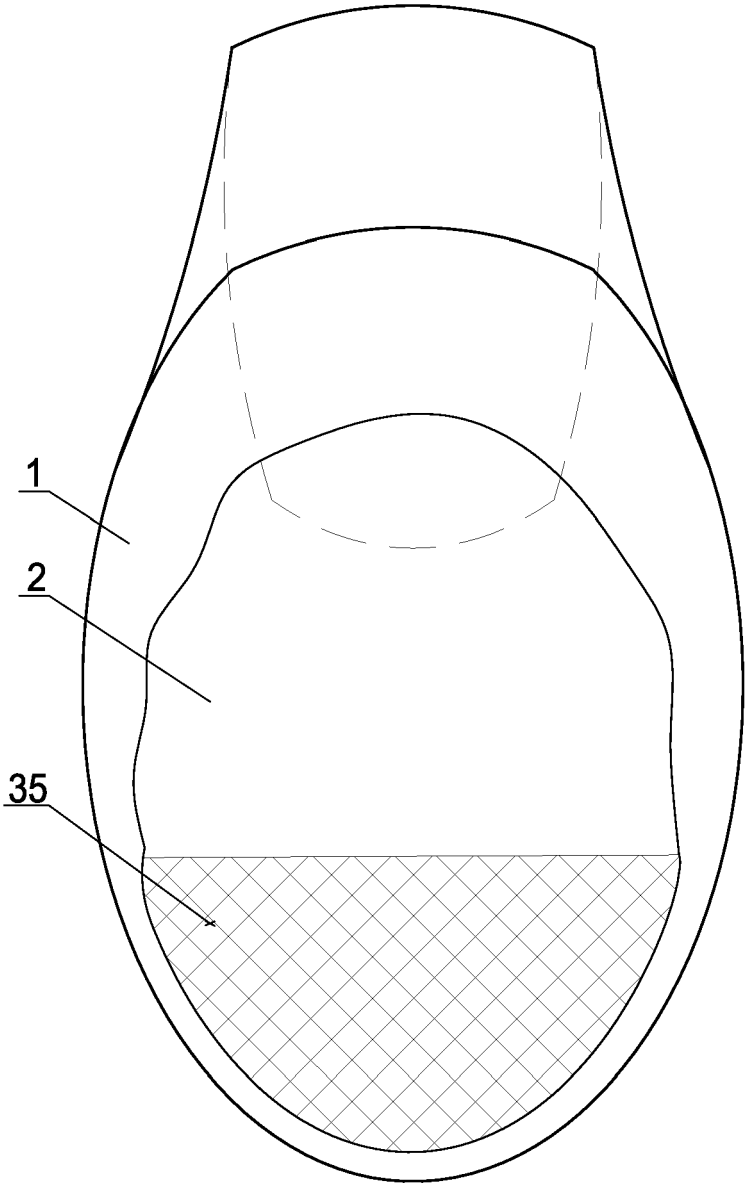

Fig.14

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EUROPEAN SEARCH REPORT

Application Number
EP 10 19 5757

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	DE 100 31 827 C1 (HELIX SCHUHFABRIK GMBH & CO [DE]) 17 January 2002 (2002-01-17) * the whole document * -----	1-5, 10-14 6-9	INV. A43B7/12 A43B23/06 A43D3/02
Y	GB 27133 A A.D. 1909 (GRUNE AUGUST HERMANN MAX [DE]) 24 March 1910 (1910-03-24) * the whole document * -----	6-9	A43D3/04 A43D11/00 A43D25/20 A43D3/14
A	WO 2007/007369 A1 (NEXTEC S R L [IT]; MORLACCHI MATTEO [IT]; OSTANI MAURIZIO [IT]) 18 January 2007 (2007-01-18) * the whole document * -----	1,2	A43D25/10

TECHNICAL FIELDS SEARCHED (IPC)

A43B
A43D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 May 2011	Tejada Biarge, Diego

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17-05-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 10031827 C1	17-01-2002	NONE	
GB 190927133 A	24-03-1910	GB 191115316 A	17-08-1911
WO 2007007369 A1	18-01-2007	CA 2614684 A1	18-01-2007
		CN 101217895 A	09-07-2008
		EP 1901628 A1	26-03-2008
		JP 2009501048 T	15-01-2009
		US 2008216354 A1	11-09-2008

EPO FORM P0459

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Patent documents cited in the description

- EP 1635665 A **[0006]**