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(54) **WATER RESISTANT FOOTWEAR AND MANUFACTURING METHOD**

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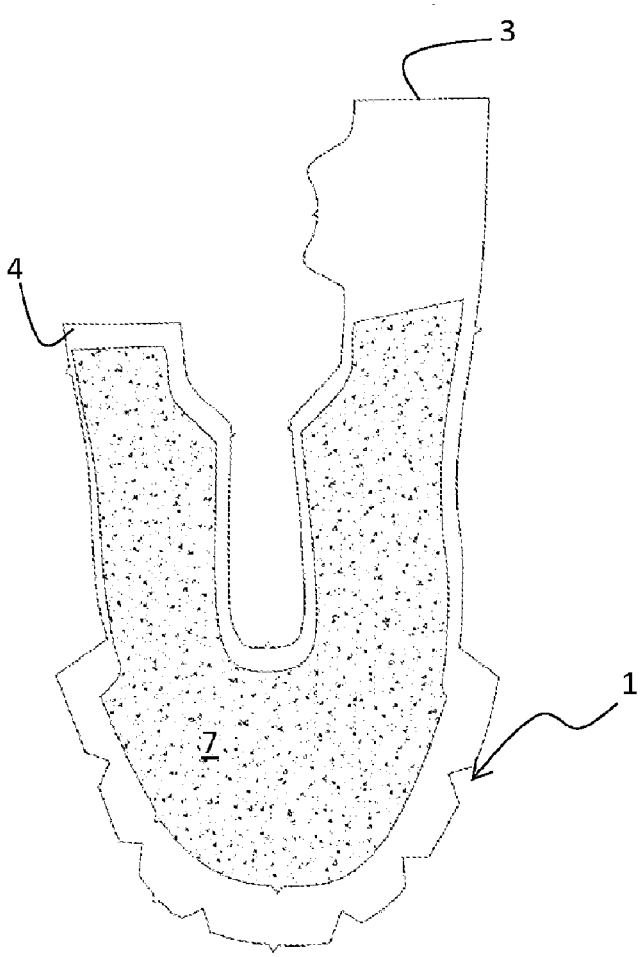
(57) **ABSTRACT**

A water resistant footwear having an upper made of a water vapor transpiring material resistant to water with a first extreme flap and at least a portion having a first thickness and provided with a second extreme flap. The first flap and the second flap have relative second thicknesses lower than the first thickness of the portion and are superimposed on each other with the interposition of a thermo-double-sided adhesive layer which can be activated by raising the temperature. The first flap and the second flap superimposed are fixed to each other by thermo-sealing. Furthermore, the footwear has an insole fixed to an edge of the upper and a waterproof sole obtained by direct injection molding on the upper and arranged so as to cover one face of the insole and seal it.



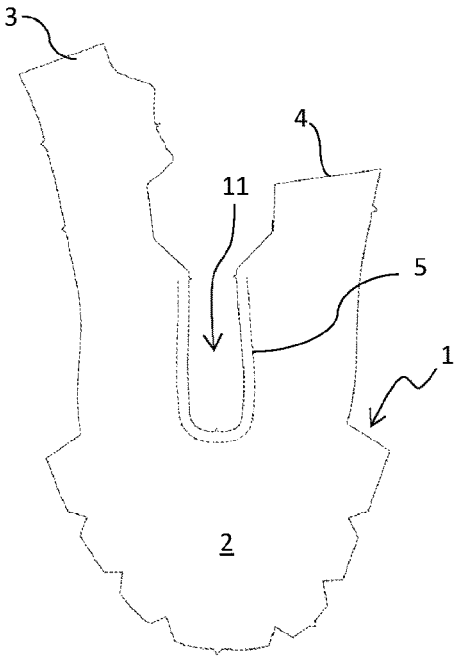


Fig.1

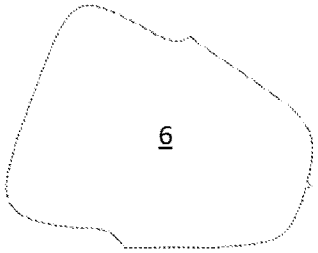


Fig.2

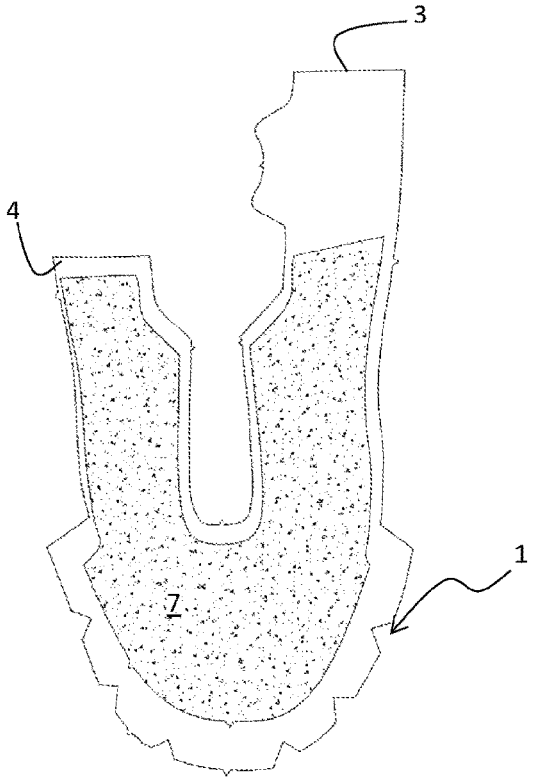


Fig.3

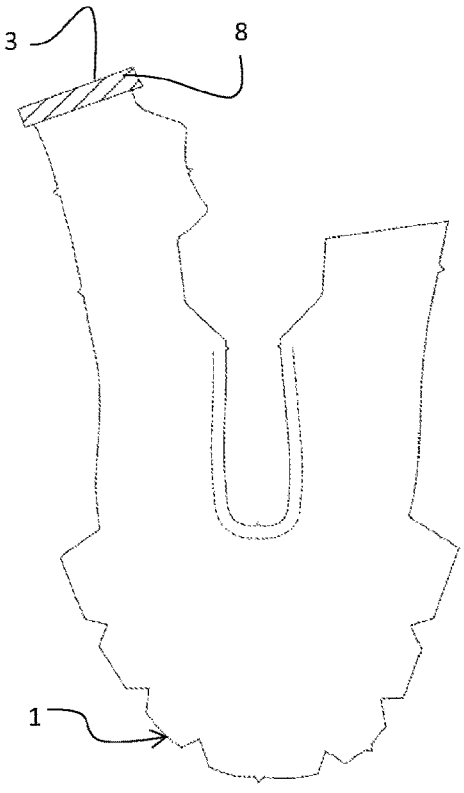
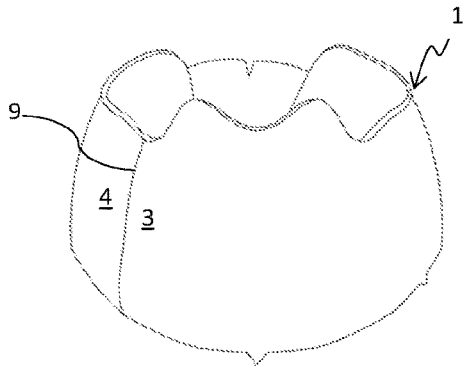


Fig.4



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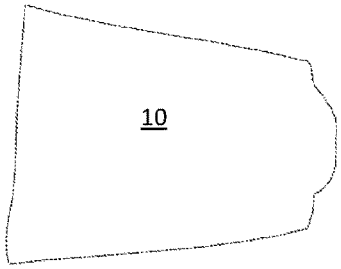

Fig.6

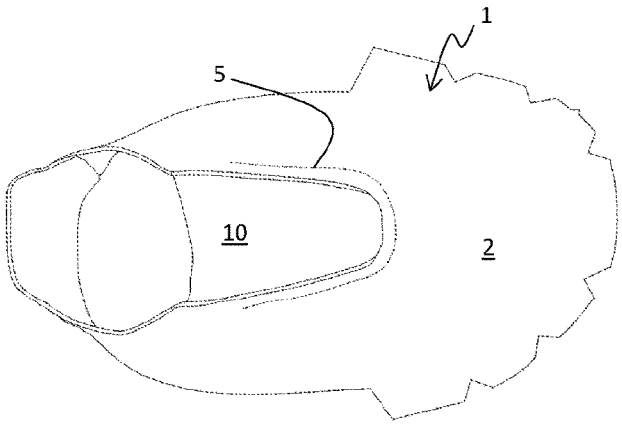

Fig.7

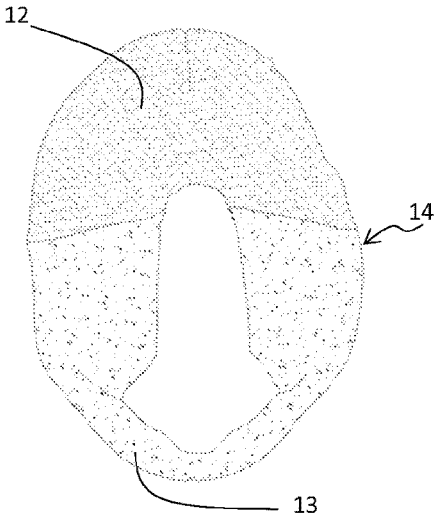

Fig.8

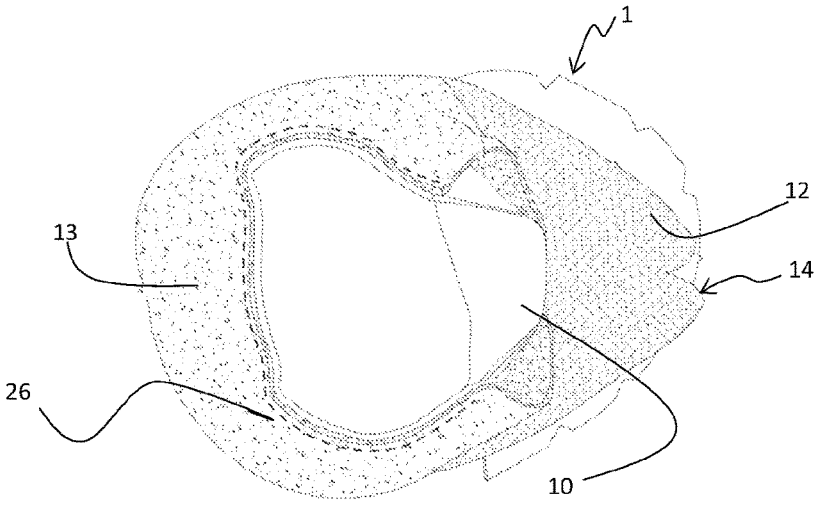

Fig.9

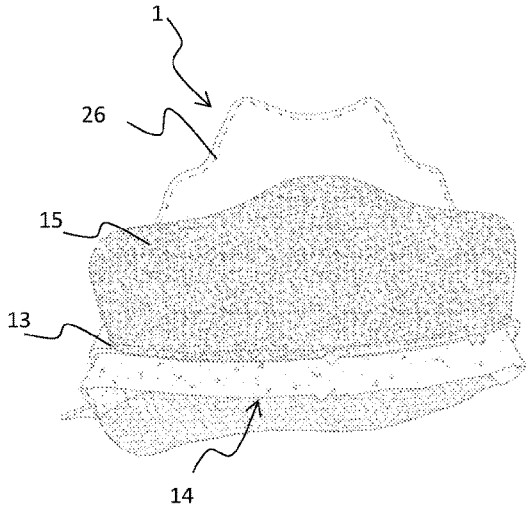

Fig. 10

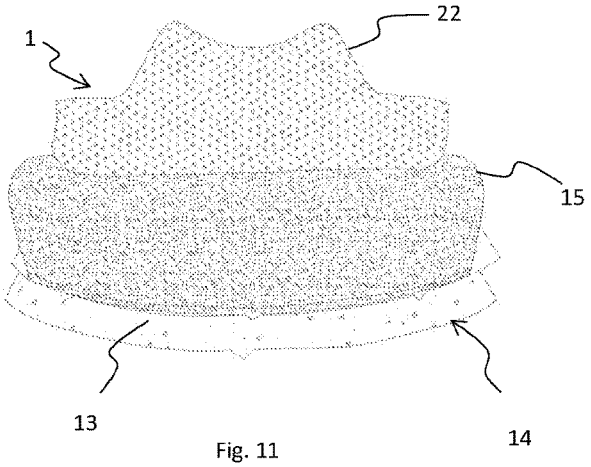

Fig. 11

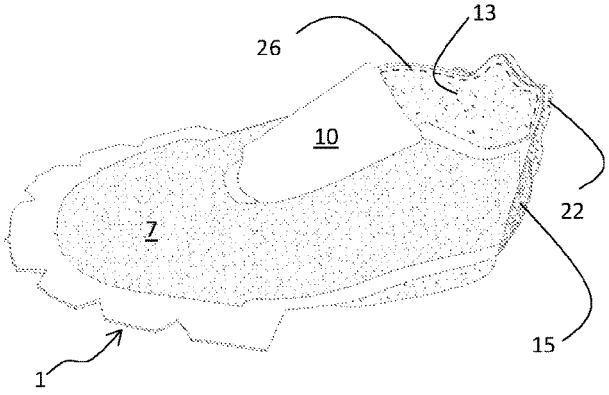

Fig. 12

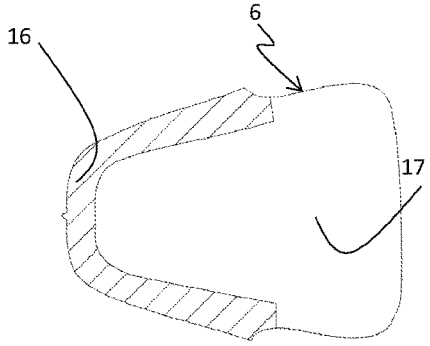

Fig. 13

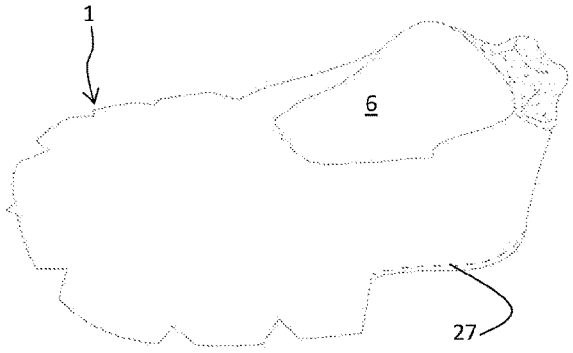

Fig.14

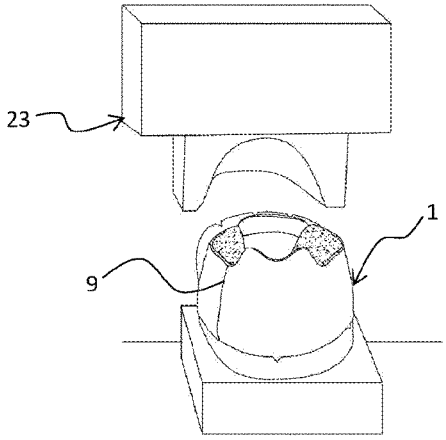

Fig. 15

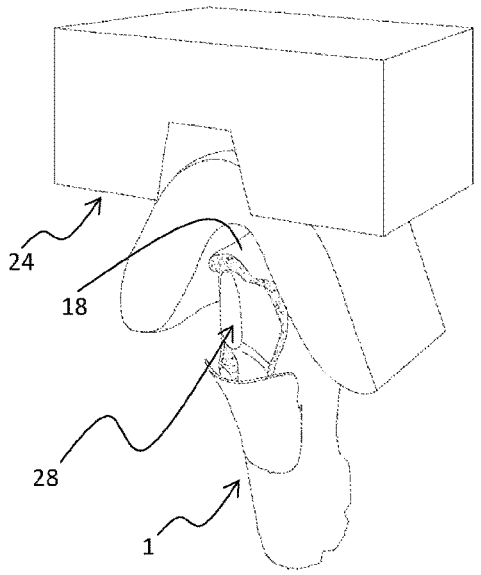

Fig. 16

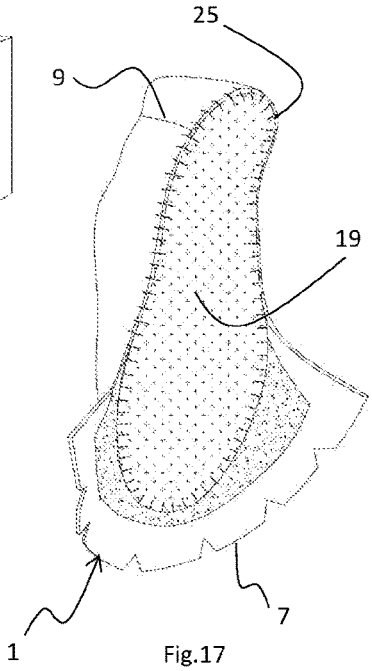

Fig.17

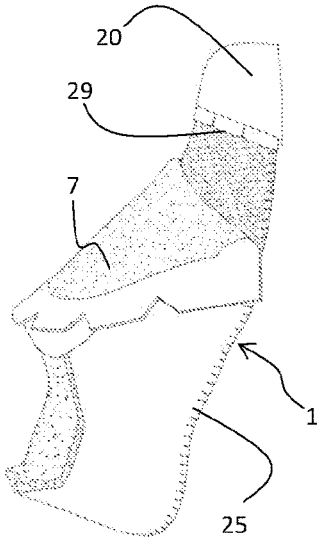

Fig.18

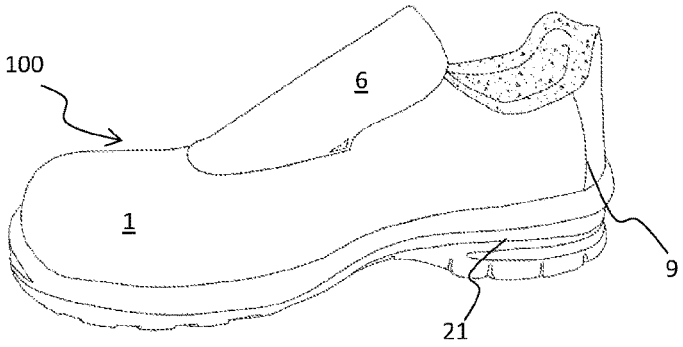

Fig.19

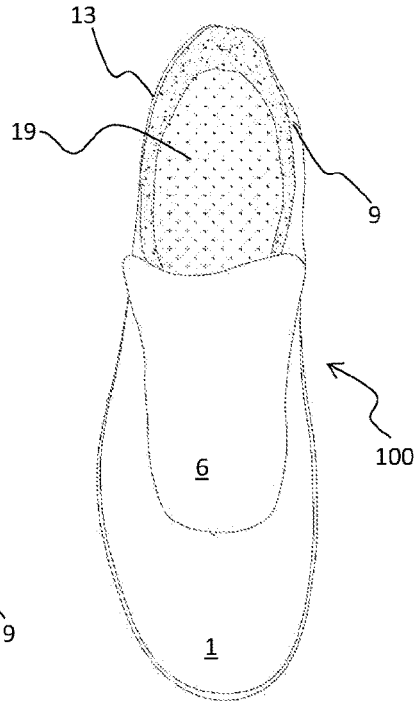

Fig.20

WATER RESISTANT FOOTWEAR AND MANUFACTURING METHOD

TECHNICAL FIELD

[0001] The present invention relates to water resistant footwear such as, preferably but not limited to footwear used in the agri-food and catering sectors.

State of the Art

[0002] As known to those working in the sector, the HACCP system (acronym from English of Hazard Analysis and Critical Control Points) is a system of risk analysis and control of critical points to ensure the prevention of risks and safety in the preparation processes of food and beverages.

[0003] In the catering and food industry, the HACCP system regulates the behavior of operators in the processing and cleaning or sanitizing phase of food. This system involves risk assessment, evaluation of possible alternatives for risk management and the adoption of measures and of Individual Protective Device (IPD) in order to prevent or avoid such risks.

[0004] The European legislation sets precisely the specifications of professional clothing, and therefore also of footwear, in the agri-food and catering sectors.

[0005] With reference to professional footwear, it is required that the upper, whatever the material that constitutes it, must meet the technical specifications relating, among other things, to the following parameters: permeability to water vapor, coefficient of water vapor, water penetration and absorption. The integral footwear must also meet water resistance requirements.

[0006] Furthermore, in relation to hygienic requirements, it is required that the professional clothing items be such as to reduce the presence and extent of forms that facilitate the entrapment or retention of impurities.

[0007] Professional footwear is known in which the upper is obtained by sewing several portions or more flaps of a shaped piece made of leather or a synthetic material (such as microfiber). Furthermore, according to this type of professional footwear, the waterproofing characteristics are obtained by using a waterproof membrane (typically, made either of PTFE or polyester) which internally covers the upper or is interposed between the upper and the inner lining.

[0008] Document WO2010/066656 describes a method of manufacturing a shoe in which a functional waterproof element interposed between the upper and lining is provided.

[0009] Document GB1144564 discloses a method of manufacturing footwear in which portions of the upper are bonded together by the application of heat and pressure.

SUMMARY OF THE INVENTION

[0010] The Applicant has noted that the traditional manufacturing techniques of footwear with waterproof characteristics (including professional footwear in the agri-food and catering sectors) are not satisfactory both because of their constructive complexity and in relation to some specifications, such as those concerning cleaning or sanitizing requirements.

[0011] The technical problem faced by the present invention is that of proposing a type of footwear of the water resistant type that is an alternative to the traditional ones and the manufacture of which is not complex, while offering satisfactory performances, for example, in relation to their cleaning and sanitization.

[0012] According to a first aspect, the above described problem is solved by a footwear as described by claim **1** and by preferred embodiments thereof as defined by dependent claims **2-7**.

[0013] In accordance with a second aspect, the above problem is solved by a method of manufacturing a footwear as described by claim **8** and by preferred embodiments thereof as defined by dependent claims **9-14**.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The present invention is described in detail below, by way of a non limiting example, with reference to the attached drawings, in which:

[0015] FIG. **1** shows, by way of example, a shaped element from which to obtain an upper;

[0016] FIG. **2** shows an example of a tongue for footwear;

[0017] FIG. **3** shows the inside of said upper to which a reinforcement fabric is applied;

[0018] FIG. **4** shows the application of a thermo-double-sided adhesive tape to a flap of the upper;

[0019] FIG. **5** shows two thermo-sealed flaps of the upper;

[0020] FIG. **6** shows an under-tongue element;

[0021] FIG. **7** shows the upper and the under-tongue element sewn to the upper;

[0022] FIG. **8** shows a step of sewing a front lining to a rear lining in order to obtain a corresponding complete lining;

[0023] FIG. **9** refers to the application of the lining to the upper;

[0024] FIGS. **10** and **11** refer to the application of a buttress and an upper padding;

[0025] FIG. **12** shows the upper before being turned over;

[0026] FIG. **13** shows a further thermo-double-sided adhesive tape applied to the tongue;

[0027] FIG. **14** shows the tongue as fixed to the upper;

[0028] FIGS. **15** and **16** refer to steps of form-shaping and cambering of the upper;

[0029] FIG. **17** shows the application of an insole by sewing, for example, by ströbel sewing;

[0030] FIG. **18** refers to the process of inserting a toe protection tip and strap into the footwear;

[0031] FIG. **19** shows the completed footwear, in a side view, equipped with a sole;

[0032] FIG. **20** shows a top view of said footwear.

DETAILED DESCRIPTION

[0033] While the invention is susceptible of various modifications and alternative constructions, some particular embodiments are shown in the drawings and will be described in detail below. In the present description, similar or identical elements or components will be indicated in the figures with the same identification symbol.

[0034] An example of a manufacturing method of a footwear **100** (FIGS. **19** and **20**) of the water resistant type is described. Preferably, the footwear **100** is of a professional type and is suitable for use in the agri-food and catering sectors, that is, in the HORECA sector (Hotellerie-Restaurant-Café, sometimes also referred to as Hotellerie-Restaurant-Catering). In particular, the footwear **100** is a safety footwear, that is an individual protection device (IPD).

[0035] FIG. **1** shows an upper **1** in an intermediate processing step, made in a single piece, that is, which no longer comprises a plurality of distinct portions sewn together, but which is formed by a single suitably shaped element. Furthermore, the upper **1** is made of a water resistant material, i.e. a waterproof material.

[0036] Even if the one piece construction is the preferred one because it allows to make a single joint between two flaps of the upper, it is possible to provide, for the construction of the upper, several separate pieces (for example, from two to four pieces) to be joined.

[0037] Advantageously, the material of the upper **1** is also breathable, that is, it is permeable to water vapor so as to facilitate the transpiration of the foot.

[0038] For example, the outer part of the upper **1** is made of microfiber. Other possible materials for the upper **1** are leather or other types of synthetic materials. In particular, if the upper **1** is used in a safety footwear, its material can be such as to satisfy the technical specifications established by a European Union standard according to tests 1) and 2), indicated below:

[0039] 1) Penetration and water absorption of the upper (ref. 6.3, EN ISO 20345:2011) after 60 min test according to the test method given in EN ISO 20344:2011 ref. 6.13:

[0040] A) water absorption not greater than 30% of the initial weight of the upper;

[0041] B) water penetration through the upper not exceeding 0.2 g.

[0042] 2) Permeability and water vapor coefficient of the upper (ref. 5.4.6, EN ISO 20345:2011) after approximately 8 h according to the test method given in EN ISO 20344:2011 ref. 6.6 and 6.8:

[0043] (a) water vapor permeability not less than 0.8 mg/(cm^2×h);

[0044] (b) water vapor coefficient not less than 15 mg/cm^2

[0045] Water penetration and absorption of test 1) define, according to an example, the resistance to water of the material of which the upper **1** is made. Instead, the permeability and the water vapor coefficient of test 2) define, according to a standard, the perspiration of the upper **1**.

[0046] Regarding water absorption, it is preferable to use an upper **1** that has an absorption between 0.00% and 20%, i.e., not more than 20%.

[0047] Furthermore, the material of the upper **1** is advantageously chosen so as to be mechanically resistant and dimensionally stable if placed in contact with chemically aggressive substances (for example, acidity of food or elements with which the food are treated). The upper **1** is also preferably of the washable type. It should also be noted that in the selection of the material for the upper **1**, the above preferred values regarding water absorption are advantageously taken into account, but also the requirements regarding the breathability of the upper itself as defined, for example, by the above standard.

[0048] Referring to the particular "one piece" solution, as shown in FIG. **1**, the (flat) upper **1** has a (curved, substantially horseshoe-shaped) main portion **2**, a first extreme flap **3** and a second extreme flap **4**. In this phase, the upper **1** is open, i.e. the two flaps **3** and **4** are not connected to each other. The curved main portion **2** defines an internal opening **11**.

[0049] In particular, marks **5** are also formed on the upper **1** which can be used as references for subsequent operations. More in detail, the marks **5** made in an area of the main portion **2** (for example, with a pencil or a felt-tip pen) are indicative of the area to which to fix a tongue of the footwear **100**.

[0050] In a subsequent step, the first flap **3** and the second flap **4** are machined to reduce their thickness with respect to the initial value; this initial value is instead maintained for the main portion **2**. In particular, a chamfering and/or skiving of the first flap **3** and of the second flap **4** is carried out in order to reduce their thickness.

[0051] Furthermore, this thickness reduction operation is also repeated for a portion of a tongue **6** which will be applied to the upper **1**, as indicated below.

[0052] According to the example described, a reinforcement fabric **7**, provided with an adhesive film that allows a thermo-adhesion, is fixed to an internal face of the upper **1** (FIG. **3**), preferably by means of a process which provides for the raising of the temperature and the application of a pressure. The reinforcement fabric **7** covers a large part of the upper **1**. For example, the reinforcement fabric **7** is fixed using a hot press machine applying a pressure of 4.5 bar and a temperature of 130° C. for 25 sec. In particular, for the application of the reinforcement fabric **7** the press machine has flat square/rectangular plates. The reinforcement fabric is preferably made of jersey or polyester. The reinforcement fabric **7** is intended to provide rigidity to the upper **1** and does not have waterproof properties.

[0053] The method described also comprises a step of fixing the first flap **3** and the second flap **4** so that the upper **1** assumes a closed configuration.

[0054] This step of fixing the flaps **3** and **4** comprises the application of a thermo-double-sided adhesive tape **8** to the first flap **3** (FIG. **4**). The thermo-double-sided tape **8** is fixed to the first flap **3** by means of an operation of raising the temperature, in which the thermo-double-sided adhesive layer of the tape **8** facing the first flap **3** is activated, and by means of a pressing operation. For example, to apply the thermo-double-sided tape **8** to the first flap **3**, a thermo-adhesion tape machine can be used which operates at the following values: temperature between 125° C. and 135° C. (in particular, equal to 130° C.), pressure of 1.5/2 relative at (where "relative at" stands for relative technical atmosphere). The values indicated are useful to obtain an efficient and uniform adhesion of the thermo-bioadhesive tape **8** to the first flap **3** on the contact surface.

[0055] Subsequently, the second flap **4** is placed in contact with the free face of the thermo-double-sided tape **8** and then a thermo-sealing operation is carried out which activates the adhesive of the free side of the thermo-double-sided tape **8**, by raising the temperature, with a simultaneous application of pressure. The pressure exerted on the second flap **4** which is superimposed on the first flap **3** facilitates its adhesion to the double-sided adhesive tape **8**.

[0056] For example, for this operation the same hot press machine mentioned in relation to the application of the reinforcement fabric **7** can be used.

[0057] According to a preferred embodiment, the heat-sealing of the second flap **4** to the first flap **3** is performed using the following process parameters:

[0058] temperature within the range 130° C.-158° C.; more preferably, within the range 147° C.-152° C.;

[0059] pressure within the range of 2.5 bar-5.0 bar; more preferably, within the range of 3.2 bar-4.5 bar;

[0060] application duration of the above temperature and pressure values in the range of 20.0 s-39.0 s; more preferably in the range of 24.0 s-32.0 s.

[0061] The above values, combined with the use of an upper **1** having a water absorption not exceeding 20%, are particularly suitable to ensure waterproofness of the footwear.

[0062] It must be noted that for making the joint of the flaps **3** and **4** the upper **1** is closed in itself in a three-dimensional way, therefore the upper itself is, according to an example, inserted in a long and narrow plate, while an upper plate can be of the flat type.

[0063] In this way, the first flap **3** and the second flap **4** are fixed to each other without making seams that pierce the waterproof upper **1**. The physical parameters of the process of thermo-adhering the thermo-adhesive **8** to the first flap **3** and thermo-welding the second flap **4** to the first flap **3** are chosen to ensure that the resulting upper **1** is impermeable to water by completely sealing the attachment areas of the two flaps.

[0064] Furthermore, it should be noted that as the first flap **3** and the second flap **4** have a reduced thickness with respect to that of the main portion **2** of the upper **1**, the area of the upper **1** in which the two flaps **3** and **4** are superimposed (zone **9** in FIG. **5**) has no significant discontinuities (such as excess thicknesses that create steps), resulting in a substantially uniform thickness.

[0065] In the event that several distinct pieces are used for forming the upper **1** (that is, a material in "one piece" is not used), the joints of these pieces advantageously take place in the same way as described above with reference to the extreme flaps **3** and **4**.

[0066] Furthermore, preferably, the fixing zone **9** of the two flaps **3** and **4** is in a position which corresponds to a rear side area of the footwear **100**. It should be noted that this position of the fixing zone **9** is advantageous in that it presents reduced stresses. Furthermore, the fixing zone **9** preferably has a vertical trend to reduce any possibility of stagnation of impurities or liquids.

[0067] According to the herein described example, the method continues with the fixing to the upper **1** of an under-tongue element **10** (FIG. **6**). This under-tongue element **10** is sewn to the upper **1** at or near the marks **5** (shown by way of example in FIG. **1**). The under-tongue element **10** is intended to come into contact with the foot of the wearer of the footwear and is preferably made of a soft and elastic material, so as to adapt to the shape of the foot and ensure a certain adjustment of the fit. For example, the sub-tongue element **10** is made of one of the following materials: LYCRA-like materials, elastic mesh, etc.

[0068] As can be seen from FIG. **7**, the under-tongue element **10** partially closes the opening **11** (FIG. **1**) identified by the curved portion of the upper **1**.

[0069] According to the example described, the manufacturing method proceeds with phases of application of linings and buttresses.

[0070] In particular, a front lining portion **12** is sewn to a rear lining portion **13** so as to form a complete lining **14**, as illustrated in FIG. **8**.

[0071] The lining **14** obtained as indicated above is then sewn to the upper **1**; FIG. **9** shows a top seam **26**.

[0072] The lining **14** is realizable, for example, in one of the following materials: polyester, polyamide, recycled polyester.

[0073] Note that the lining **14** is directly facing the upper **1** or between the lining **14** and the upper **1** is interposed only the reinforcement fabric **7** (if provided). Note that, advantageously, there is no waterproof membrane associated with the upper **1**.

[0074] Advantageously, a buttress **15** and a padding **22** are applied to the upper **1**, for example, by underneath sewing between the buttress **15** and the upper **1** and then by gluing the padding **22** to the buttress, as indicated in FIGS. **10** and **11**. The buttress **15** and the padding **22** are intended to be placed in a rear position of the final footwear, as shown in FIG. **12**.

[0075] Subsequently, the upper **1** is turned over so that it assumes the configuration shown in FIG. **14**.

[0076] In this configuration it is advantageously possible to complete the sewing of the rear lining **13**, on the lower flaps, to the upper **1** (lower sewing **27**).

[0077] Subsequently, it is possible to proceed with the steps of applying the tongue **6** (shown in FIG. **2**) to the upper **1** so that it extends above the under-tongue element **10**, which is already applied to the upper **1**, covering the seams thereof.

[0078] The tongue **6** has already been subjected to the thickness reduction operation, as described above. Advantageously, the tongue **6** is fixed to the upper **1** with a thermo-sealing procedure similar to that used for fixing the two flaps **3** and **4** of the upper **1**.

[0079] In greater detail, the area of application of the tongue **6**, defined by the marks **5** is cleaned, and then the application is made of a further thermo-double-sided tape **16** (FIG. **13**) on an internal face of the tongue **6** in correspondence with a first portion of the flap, leaving instead a second portion **17** free of adhesive. The application of the further thermo-adhesive tape **16** to the inner face of the tongue **6** may be performed using process parameters similar to the thermo-adhesive parameters described with reference to the application of the thermo-adhesive tape **8** to the first flap **3**. The tongue **6** is then arranged (FIG. **14**) so that the exposed face of the further thermo-adhesive tape **16** adheres to the upper **1** and so the tongue **6** covers the under-tongue element **10**.

[0080] The adhesion of the tongue **6** is favored by a thermo-welding operation that includes a thermal stabilization (raising the temperature) and a pressing carried out by means of a shaper **23** that also allows to give the desired shape to the upper **1** (FIG. **15**), making it assume a three-dimensional concave shape suitable for overlapping a foot. Such heat-sealing can advantageously be done using the same process parameters described in relation to heat-sealing for flaps **3** and **4**.

[0081] Also in this case, the process parameters indicated are useful for obtaining impermeability. The tongue **6** is intended to result, in the footwear **100** as completed, higher (evaluating this height from the sole of the footwear) than the portion of the upper **1** to which it is attached, which results lower and that is closer to the sole. In order to avoid that the mode of fixing the tongue **6** to the upper **1** may form a substantially horizontal step capable of collecting and retaining dirt, in the application of the tongue **6** to the upper **1** it is advantageously proceeded in such a way that the portion of the upper **1** interested in the fixing results below

(i.e., more internal) the tongue **6**, which instead surmounts the upper **1**, resulting external to the finished footwear. Thanks to the fact that the tongue **6** overlaps the portion of upper **1** to which it is fixed, it favors the sliding of dirt/impurities, possibly present on the tongue **6** towards the ground, on which the footwear rests.

[0082] As shown by way of example in FIG. **16**, a cambering of the heel **18** of the upper **1** is then carried out. This cambering can be carried out, for example, by means of a cambering machine **24** (which operates, for example, with the following values: 150° C., 15 sec, 0.4 MPa) associated with a form **28**. The cambering machine **24** is represented schematically in FIG. **16**.

[0083] As known, "cambering" (in Italian language also known as "garbatura") is an operation consisting in giving, generally through a special machine, to a piece (particularly the upper) that has been obtained flat from the model, a curvature such as to make it adhere easily to the form and to facilitate the assembly of subsequent components. In this phase, due to the raising of the temperature, the glue present on the buttress **15** is reactivated and with the pressure the buttress **15** adheres to the upper **1**.

[0084] Subsequently, as shown in FIG. **17**, an insole **19** is fixed (for example, by a ströbel sewing **25**) to the lower part of the already shaped upper **1**. As an alternative to the ströbel sewing **25**, a classic assembly can be carried out using fixing nails or a thermoplastic glue, as is known to those skilled in the art.

[0085] This insole **19** can advantageously be of the anti-perforation type.

[0086] If the insole **19** is of the anti-perforation type, it can be of the textile type, i.e., it can be made for example with a multilayer fabric in ballistic polyester, but other materials are not excluded. Alternatively, the anti-preformation property can be obtained by using an insole made of a traditional material (for example, a non-woven fabric-TNT; fiber cardboard, or synthetic material) with the interposition, between the insole itself and the sole of the footwear **100**, of a metal foil.

[0087] Furthermore, according to the example, a band **29** is glued to a toe protection tip **20**.

[0088] FIG. **18** shows a phase of housing the tip **20** provided with a band **29** on the tip of the upper following the distribution of glue on the internal surface of the tip **20** to glue it to the upper **1**. The upper **1** is pulled and closed on the tip **20** and glued under the front part of the insole (this operation is called "pre-mounting"). Then a temperature increase (for example, up to 130° C.) and a subsequent stabilization at low temperature, are carried out.

[0089] By using, for example, a grinding wheel, it is also possible to remove the excess parts of the upper **1**.

[0090] The sole **21** is then constructed (FIG. **19**), for example, by direct injection molding on the upper. The sole **21** is made, for example, by injecting liquid polyurethane into a closed mold on the upper **1**. This technique also allows the insole **19** to be sealed, which is essential for the purposes of waterproofing the finished footwear **100**.

[0091] The footwear **100** is then completed, as shown in the views of FIGS. **19** and **20**.

[0092] The footwear **100** in its entirety can be made, using the method described above, in such a way as to be waterproof. In particular, considering the requirement shown in EN ISO standard "paragraph 6.2.5, EN ISO 20345: 2011", the footwear **100** can be such that after a dynamical flexion test in water for 4800 cycles lasting 80 min, carried out according to the test method described in EN ISO 20344 standard: 2011 ref. 5.15, has an internal humid area of less than 3 cm^2.

[0093] The footwear **100** and the manufacturing method described have numerous advantages.

[0094] An advantage is due to the fact that the fixing of the flaps **3** and **4** of the upper **1** and the fixing of the tongue **6** to the upper **1** are carried out without seams but by thermo-sealing. According to traditional techniques, the seams made for the purpose of joining have a component of the upper that surmounts the other one and the step that is formed (greater than 1 mm) is a source of accumulation of impurities (dirt) and stagnation of liquids which could therefore more easily infiltrate. The technique described above avoids the formation of such a thick step and consequently the accumulation of dirt and stagnation of liquids. The feature whereby the tongue **6** overlaps the portion of the upper **1** to which it is attached helps to prevent step formation, as discussed above.

[0095] Furthermore, it should be noted that often in the workplace there is a strong presence of liquids and there are climatic conditions with high temperatures (such as, for example, the kitchens). The absence of seams between portions of the upper **1** and with the tongue **6** of the footwear **100** reduces the risk of penetration of liquids from the cracks caused in traditional footwear by the passage of the needle. It should also be noted that the construction technique of the present solution avoids the use of waterproof membranes to be provided inside the upper, as instead occurs in some types of footwear of the known art. These membranes are not very breathable, therefore they are highly not recommended in work environments with high temperatures (kitchen).

[0096] In addition, it should be noted that the sole-making technique which uses liquid polyurethane is particularly advantageous and allows at the same time to seal the insole **19** and to make the sole **21** by direct injection onto the upper, without the need to glue and/or sew it subsequently.

LIST OF NUMBERS IN THE DRAWINGS

[0097] footwear **100**
[0098] upper **1**
[0099] main portion **2**
[0100] first extreme flap **3**
[0101] second extreme flap **4**
[0102] marks **5**
[0103] tongue **6**
[0104] reinforcement fabric **7**
[0105] thermo-double-sided tape **8**
[0106] junction zone **9**
[0107] under-tongue element **10**
[0108] internal opening **11**
[0109] front lining **12**
[0110] back lining **13**
[0111] full lining **14**
[0112] buttress **15**
[0113] further thermo-double-sided tape **16**
[0114] second portion **17**
[0115] heel **18**
[0116] insole **19**
[0117] tip **20**
[0118] sole **21**
[0119] padding **22**
[0120] shaper **23**

[0121] cambering machine **24**
[0122] ströbel sewing **25**
[0123] upper seam **26**
[0124] under seam **27**
[0125] cast **28**
[0126] band **29**

1. Water resistant footwear comprising:
an upper in a material which is water vapor transpiring and resistant to water comprising a first extreme flap and at least one portion having a first thickness and equipped with a second extreme flap;
wherein the first flap and the second flap have relative second thicknesses lower than the first thickness of said portion;
the first flap and the second flap are superimposed on each other with the interposition of a thermo-double-sided adhesive layer which can be activated by raising the temperature;
the superimposed first flap and second flap are fixed to each other by heat sealing;
an optional reinforcement fabric fixed to an internal face of the upper;
a lining fixed to the upper so as to result directly faced to said internal face of the upper or to be faced to the optional reinforcement fabric;
an insole fixed to an edge of the upper;
a waterproof sole obtained by direct injection molding on the upper and arranged so as to cover one face of the insole and seal it.

2. Footwear according to claim **1**, further comprising:
an under-tongue element fixed by sewing to a region of the upper;
a tongue fixed to the upper by means of a further thermo-double-sided adhesive layer which can be activated by raising the temperature and fixed to the upper by means of heat sealing; the tongue extending so as to overlap the under-tongue element to cover the seam; said tongue having a portion surmounting a relative fixing portion of the upper.

3. Footwear according to claim **2**, wherein said insole is of the anti-perforation type and is made according to one of the following methods: insole in multilayer ballistic polyester fabric; insole associated with a metal sheet.

4. Footwear according to claim **2**, wherein:
the under-tongue element is made of a soft material;
the tongue is made of the same material as the upper.

5. Footwear according to claim **1**, wherein said footwear is configured to be an individual protection device suitable for use in at least one of the following sectors: agri-food sector, catering sector, HORECA sector.

6. Footwear according to claim **1**, comprising said reinforcement fabric arranged to cover at least partially the inner face of the upper; said reinforcement fabric being made of one of the following materials: jersey; and polyester.

7. Footwear according to claim **1**, wherein said lining is made of one of the following materials: polyester, polyamide, and recycled polyester.

8. Method of manufacturing a water resistant footwear comprising:
manufacturing of a shaped element for upper made of a transpiring and water resistant material; in which the shaped element for upper comprises a first flap and at least a portion provided with a second flap; the first and second flaps have a relative first thickness;
carrying out a process of reducing the thickness of the first flap and the second flap so that they assume relative second thicknesses lower than the first thickness;
arranging a thermo-double-sided adhesive layer which can be activated by raising the temperature at said first flap;
activating the thermo-adhesive layer by raising its temperature so as to make it adhere to the first flap;
overlapping the second flap to the first flap with the interposition of the thermo-double-sided adhesive layer;
fixing the first flap to the second flap by heat sealing causing a temperature rise and exerting a pressure on said first and second overlapping flaps and obtaining a corresponding upper;
giving the shaped element a three-dimensional shape obtaining the corresponding upper;
optionally covering one face of the shaped upper element with an optional reinforcing fabric;
sewing to said upper a front lining and a back lining; wherein the lining is either directly facing the upper or is facing the optional reinforcement fabric;
fixing an insole to a lower edge of the upper;
forming by direct injection molding on the upper a waterproof sole which covers one face of the insole so as to seal it.

9. Manufacturing method according to claim **8**, further comprising, before giving the shaped element a three-dimensional shape obtaining the corresponding upper:
fixing by sewing an under-tongue element to an area of the upper indicated by marks;
placing a further thermo-double-sided adhesive layer on a portion of a tongue;
activate the further thermo-double-sided adhesive layer by raising the temperature so that it adheres to the tongue portion;
superimposing said portion of the tongue to a portion of the upper with the interposition of the further thermo-double-sided adhesive layer and so that the tongue covers the under-tongue element, in particular, said sub-tongue fixing seam;
fixing the tongue to the upper by means of heat-sealing, activating the additional thermo-adhesive layer by raising the temperature and applying pressure.

10. Manufacturing method according to claim **8**, wherein:
either the shaped element for upper is in one piece and the first flap and the second flap are ends of said portion; or
the shaped element for the upper includes in addition to said portion at least one further portion associated with the first flap.

11. Manufacturing according to claim **8**, wherein: coating one face of the shaped element for upper with a reinforcement fabric comprises: securing the reinforcement fabric by raising the temperature and exerting pressure.

12. Manufacturing method according to claim **8**, wherein the upper is made of a washable material.

13. Manufacturing method according to claim **8**, wherein the heat sealing is performed according to the following process parameters:
temperature within the range 130° C.-158° C.;
pressure in the range of 2.5 bar-5.0 bar;
duration of application of the above temperature and pressure values in the range of 20.0 s-39.0 s.

14. Method according to claim **13**, wherein said upper is made of a material having a water absorption of not more than 20%.

15. Manufacturing method according to claim **13**, wherein the heat sealing is performed according to the following process parameters:

temperature within the range 147° C.-152° C.;

pressure in the range of 3.2 bar-4.5 bar;

duration of application of the above temperature and pressure values in the range of 24.0 s-32.0 s.

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