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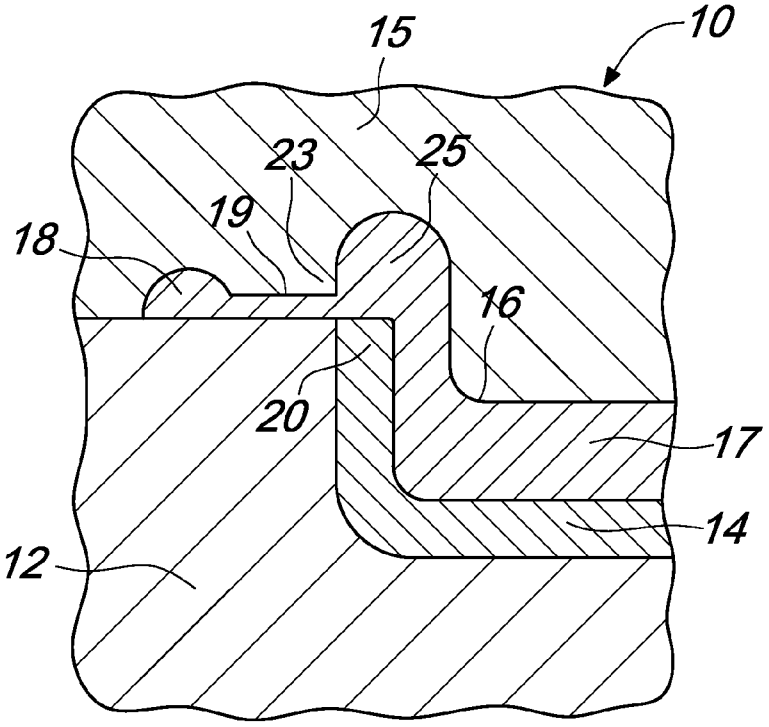
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(54) Title: METHOD FOR MOLDING MULTICOLOR ETHYL VINYL ACETATE ARTICLES AND APPARATUS FOR PERFORMING THE METHOD



(57) Abstract: A method for molding multicolor articles made of ethyl vinyl acetate, comprising the steps of: injecting into a first impression (11) EVA of a first color to mold a first portion (14) of a multicolor article to be obtained, the lower mold part (12) and the first upper mold part (13) being at a temperature which is lower than the melting point of EVA; opening the mold; closing the lower mold part (12) with a second upper mold part (15) which has a higher temperature than the EVA cross-linking temperature, in order to form a second impression (16) which is complementary to the first one and is adapted to provide a second portion (17) of the article to be obtained; injecting EVA of a second color to overmold on the first portion (14) the second portion (17) of the article to be provided, and simultaneously heating the lower mold part (12) to a temperature which is higher than the cross-linking temperature; once cross-linking has been completed, opening the mold and extracting the article. At least one of the mold parts (12, 13, 15) is shaped so as to form, with its complementary part, flash (18) around the corresponding impression.

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METHOD FOR MOLDING MULTICOLOR ETHYL VINYL ACETATE ARTICLES AND APPARATUS FOR PERFORMING THE METHOD

Technical Field

The present invention relates to a method for molding multicolor ethyl vinyl acetate articles.

The present invention also relates to a molding apparatus for performing said method.

The following expressions are intended in an equivalent manner hereinafter:

- "cavity" and "lower mold part";
- "lid of the first color" and "first upper mold part";
- "lid of the second color" and "second upper mold part".

Background Art

As is known, it has long been common practice to provide molded bottoms made of a thermoplastic material which consists of an expansible cross-linking compound based on polyolefins.

The traditional method for molding this material entails injecting it in the fluid state at high temperature into an appropriate forming cavity in order to obtain any chosen article and entails that such article, once it is extracted from said cavity, tends first to expand and then shrink in the final cooling step.

The long-standing experience accumulated in this type of technology has allowed to "control" the expansion and subsequent shrinkage of such articles obtained by molding and thus to provide finished products which comply perfectly, in terms of dimensions, with the specific requirements.

A similar technology is currently used to provide articles of various kinds and also certainly bottoms to be fitted on shoes. However, while it is true that such a treatment technique is used advantageously to provide bottoms for shoes in a single color, it is equally undeniable that for the time being said technique is scarcely suitable for providing two-color bottoms,

such as the ones which, for example, adopt a given color at the foot supporting surface and a different color at the respective tread.

Indeed, in order to obtain such an article it would be necessary to perform two distinct moldings of the thermoplastic material, each of a specific color, within a same mold conveniently provided with two different lids.

However, it must be noted that those who have tried so far to implement such a technology have never been able to achieve a result which was truly satisfactory in terms of quality of the resulting product.

The problems linked to this technology will become better apparent after a brief description of the ways in which attempts have been made so far to provide a two-color bottom for shoes molded with the expansible cross-linking polyolefin compound.

From this standpoint, first of all the first color is injected into a mold (which is closed by a corresponding lid); during this operation, said mold is kept at a temperature of approximately 40-50 °C and in fact in this regard one speaks of "cold molding". However, it should be noted that the temperature of the mold is controlled by means of a thermocouple, which is suitable to enable the injection of the first color only when the mold is detected to have reached the above cited operating temperature.

In any case, this first molding of the thermoplastic material fills, within said mold, only the impressions that correspond to the portions of the bottom for shoes that will have to adopt that specific color. The injection of the second color is performed in a time comprised between 30 and 60 seconds after the first injection operation.

For this purpose, the lid of the mold (known as "first color lid" in the jargon) is removed and a second lid (known as "second color lid" in the jargon) is applied, indeed to perform the injection of the second color; during this operation, the temperature of the mold is brought to approximately 180 °C.

In this manner, this second color fills, within the respective above mentioned lid, the impressions that correspond to the portions of the bottom for shoes that are designed to assume the specific coloring of this second injection of material.

The main drawback of this technology resides in that within the same mold the molding of the second color partially or fully overlaps the already partially consolidated molding of the first color.

This overlap induces in the first color a new heating, which tends to return it to the fluid state and to determine, at the regions of mutual interference, a sort of fusion between the two moldings of different colors.

Indeed, the flow of the material of the second color is capable of applying an abrasive action on the top of the material of the first color and therefore of generating, with respect to the surface layers of the latter, an entrainment effect, which leads to a mutual interpenetration of the materials of the two different colors.

This entrainment effect is indeed what causes the article being formed to possibly exhibit, at the portions of interference between the regions of the two different colors, an evident and uncontrolled "contamination" of the second color by the first one, which is certainly capable of compromising intolerably the quality of the entire production.

International Application WO2006EP69602 further contains teachings for performing a method for molding articles in multiple colors made of ethyl vinyl acetate (hereinafter EVA) and the description of a machine for performing the method.

The method comprises the steps of:

– injecting in a first mold EVA of a first color to mold a first portion of a multicolor object to be obtained, at such a temperature as to allow to form said first portion without starting the expansion of the EVA;

– injecting in a second mold, at said temperature such as to allow to form the portion without starting EVA expansion, onto said first portion

kept substantially at the same temperature as the preceding injection, EVA of a second color, for the overmolding of a second portion of the object being manufactured;

– heating the second mold to the cross-linking temperature of the EVA for the time required for the complete cross-linking of said first and second portions of the object;

– once cross-linking has been completed, opening the second mold and extracting the finished object.

The International Application cited above discloses and claims a machine provided with means for performing said method for molding multicolor objects made of EVA, said means comprising:

– a first mold for forming a first portion of an article to be manufactured, which in turn is composed of a lower mold part and an upper mold part;

– a second mold for forming a second portion, which has a different color with respect to the first portion, of the article to be manufactured, said second mold being composed of the previous lower mold part with the first portion of the article still inside it, and of a second upper mold part.

This method and these means are well-suited for the molding of soles, slippers, sanitary clogs, and in general technical items made of two-color EVA.

However, it has been found experimentally that this method creates energy problems, since the cyclic occurrence of heating to cross-link the EVA and cooling to restore the thermal conditions that allow injection without cross-linking, both of the lower mold part and of the second upper mold part, entail considerable consumption together with other important problems linked to the speed of the production cycle, which must comply with the times of the thermal variations of the mold parts.

Disclosure of the Invention

The aim of the present invention is to provide a method for molding

multicolor articles made of ethyl vinyl acetate which is capable of obviating the drawbacks shown by the known method.

Within this aim, an object of the invention is to provide an apparatus which allows to optimize the execution of the method.

Another object of the present invention is to provide a method which allows considerable energy saving with respect to the method cited above.

Another object of the invention is to provide an apparatus which can be managed by way of known types of molding machine.

Another object of the invention is to provide an apparatus which allows to provide molding machines which are cheaper than those tested.

Another object of the present invention is to provide a method and an apparatus for performing it which are simple and cheap to provide with known systems and technologies.

Another object of the present invention is to provide an innovative molding system which can be provided by means of a specifically designed mold which at last allows to prevent the structure of a bottom for shoes from remaining inherently and irreversibly altered by said uncontrolled interpenetration of the two injections of the molding material in different colors.

This aim and these and other objects, which will become better apparent hereinafter, are achieved by means of a method for molding multicolor articles made of ethyl vinyl acetate, which comprises the steps of:

– injecting into a first impression, formed by a lower mold part and a first upper mold part, EVA of a first color to mold a first portion of a multicolor article to be obtained, said lower mold part and said first upper mold part being at a temperature which is lower than the melting point of EVA;

– opening the mold;

– closing said lower mold part with a second upper mold part which has a higher temperature than the EVA cross-linking temperature, in order

to form a second impression which is complementary to the first one and is suitable to provide a second portion of the article to be obtained;

– injecting EVA of a second color to overmold on said first portion said second portion of the article to be provided, and simultaneously heating said lower mold part to a temperature which is higher than the cross-linking temperature;

– once cross-linking has been completed, opening the mold and extracting the article.

In this manner it is finally possible to obtain a two-color bottom for shoes within which the portions made with the two different colors are clearly distinct from each other, to the full advantage of the quality of the entire article.

On the basis of this groundwork, it is specified first of all that the present invention has been conceived after acknowledging that it is impossible to prevent completely the mutual interpenetration of two subsequent injections of the thermoplastic material performed in the same mold, if the second one has a significantly higher temperature than the first one.

Starting from this inescapable assumption, the idea on which the present invention is based is to "control" this inevitable process of interpenetration of the two subsequent moldings of material so as to avoid leaving evident and irreversible traces of such interpenetration within the actual structure of a two-color bottom.

Rather, provisions have been made so that the "mix" of the two subsequent injections of different colors that occurs in any case within the mold cavity can be conveyed toward the outside of said cavity, in the direction of an appropriately provided small tubular perimetric "discharge" chamber.

This means that the two-color bottom extracted from such a mold has a particular perimetric "bead", which is obtained with said mix of the two

different moldings of thermoplastic material but can be removed easily by means of a traditional trimming operation.

Of course, once this "hybrid" perimetric bead has been removed, the resulting bottom has the sought clean separation between the portions provided in the two different colors.

The following expressions are understood to be equivalent hereinafter:

– "mold", "forming mold" and "apparatus";

– "first color", "material of the first color" and "EVA of a first color";

– "second color", "material of the second color" and "EVA of a second color";

– "first step of operation" and "inject into a first impression";

– "second step of operation" and "inject EVA of a second color";

– "first color 1a" and "first portion 14";

– "impression 2" and "second impression";

– "duct", "perimetric duct", "half-chamber" and "perimetrically arranged groove";

– "horizontally arranged slit" and "spacing gap";

– "thin flash BA", "flash" and "engineered flash";

– "intermediate perimetric step" and "groove".

Further, the expressions "impressions 1a" and "impressions 1b" reference portions of said "first impression".

Brief Description of the Drawings

Further characteristics and advantages of the invention will become better apparent from the following detailed description of the method and of preferred but not exclusive embodiments of the apparatus, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figures 1 and 2 are schematic views of two schematic examples related to the optimization of an apparatus according to the invention;

Figure 3 is a view of a detail of the apparatus according to the

invention in a first embodiment thereof;

Figure 4 is a view of a detail of the apparatus according to the invention in a second embodiment thereof;

Figure 5 is a view of another detail of the apparatus according to the invention;

Figure 6 is a transverse sectional view of the mold with the so-called lid "of the first color" in the operating position but before the injection of the material;

Figure 7 is a view similar to Figure 6 but intended to show the same mold provided with the so-called lid "of the second color", after the injection of the first color;

Figure 8 is similar to Figure 7 but refers to the mold after the injection of the second color;

Figure 9 is a sectional view of the two-color bottom, freshly extracted from said mold and therefore still integrating said perimetric bead;

Figure 10 is a view similar to Figure 9 but intended to show said bottom after said perimetric bead has been removed.

Ways of carrying out the Invention

With reference to the figures, a method for molding multicolor articles made of ethyl vinyl acetate according to the invention comprises the following operations:

– injecting into a first impression 11, formed by a lower mold part 12 and a first upper mold part 13, EVA of a first color to mold a first portion 14 of a multicolor article to be obtained; the lower mold part 12 and the first upper mold part 13, shown by way of schematic example in Figure 5, being at a temperature which is lower than the melting point of EVA;

– opening the mold;

– closing the lower mold part 12 with a second upper mold part 15, as shown schematically in Figure 3; the second upper mold part 15 being at a temperature which is higher than the cross-linking temperature of the EVA;

the lower mold part 12, which contains internally the first portion 14, forming together with the second upper mold part 15 a second impression 16 which is complementary to the first impression and is suitable to provide a second portion 17 of the article to be obtained;

– injecting EVA of a second color for the overmolding, onto the first portion 14, of the second portion 17 of the article to be provided and simultaneously heating the lower mold part 12 to a temperature which is higher than the cross-linking temperature;

– once cross-linking has been completed, opening the mold and extracting the article.

The temperature below the melting point of EVA is between 60° and 100 °C.

Such temperature higher than the EVA cross-linking temperature is comprised between 160 and 190 °C.

The EVA of a first color is injected into the first impression 11 at a temperature comprised between 80 and 110 °C, and likewise the EVA of a second color is injected into the second impression 16 at a temperature comprised between 80 and 110 °C.

Therefore, this method does not entail the repetition of heating and cooling cycles both for the lower mold part and for the second upper mold part, but only for the lower mold part, with a consequent saving both in terms of energy consumption and in terms of construction, since the second upper mold part can be provided with a cooling system which has a low cost or even without a cooling system.

It has been found experimentally that with this method it is difficult to achieve an exact and precise definition of the contours of the two portions of different color, since, as exemplified in Figure 1, the first portion, designated therein by the reference letter A and molded first in a first color, tends to form flash at its first perimetric border B, which directly faces or is in contact with the edge D of the second upper mold part E.

The second upper mold part E is in fact at a temperature which is higher than the EVA cross-linking temperature, therefore generally higher than 150 °C, and accordingly the edge D heats the border B of the first portion A until it melts, so that upon injection of the EVA into the mold to form the second portion E, of a second color which is different with respect to the first portion A, the melted border B tends to mix with the contiguous border F of the second portion.

Further, the less than perfect delimitation of the two portions of different colors may be due to a further unwanted phenomenon, which is linked to the high pressure at which the EVA is injected to form the first portion; said high pressure is imposed by the fact that the EVA is injected into the first mold, to provide the first color, as a temperature which is lower than the melting point, and once it has entered the mold it becomes very "hard", because the mold is kept at said temperature which is lower than the melting point.

Accordingly, to perform the injection it is necessary to use injection pressures of such a level that it is difficult to maintain a perfect closure of the two mold parts, and consequently small amounts of material may form flash, as shown in Figure 2, where the reference letter B again designates the perimetric border of the first portion A and the reference letter G designates the overpressure flash.

Such flash is a further source of imperfection, since it tends to melt and mix with the second portion D when the second upper mold part E is closed, at a temperature which is higher than the cross-linking temperature, onto the lower mold part.

Therefore, the invention also relates to an apparatus for performing the method according to the invention.

The apparatus 10 comprises a mold which is composed of a lower mold part 12 and two upper mold parts, a first one 13 and a second one 15, to be arranged on the lower mold part in order to form respectively a first

impression 11 and a second impression 16 which is complementary to the first one.

At least one of the mold parts 12, 13 and 15 is shaped so as to form with its complementary mold part, flash 18 around the corresponding impression.

In the first embodiment of the apparatus, shown by way of example in Figure 3, the second upper mold part 15 has a groove 19 which runs perimetrically with respect to the respective impression 16 and forms an interspace for spacing between the perimetric border 20 of the first portion 14, provided in the first impression 11, and the nearby edge 23 of the second upper mold part 15; said interspace allows to form the engineered flash 18.

EVA of the second color, which arrives from the perimetric border 25 of the second portion 17, and optionally, depending on the pressure and temperature conditions, also EVA of the first color, which arrives from the perimetric edge 20 of the first portion 14, enters the interspace; the two-color EVA mixes within the groove 19, forming indeed the engineered flash 18 which can be removed by way of known methods.

The mixing of EVA of two different colors is therefore confined to the groove 19 and to the corresponding flash 18 that forms therein; the removal of the flash 18 therefore allows to obviate the problem of the mixing of EVA of two different colors at the boundary regions between the first portion 14 and the second portion 17 of the article to be provided, and to obtain an article in which the boundaries between the two portions of different color are the predefined ones and are outlined continuously.

In the second embodiment of the apparatus according to the invention, exemplified schematically in Figure 4 and designated therein by the reference numeral 110, the lower mold part 112 and the second upper mold part 115 each have a groove, respectively 119 and 121, which lies perimetrically with respect to the respective impression 111 and 116 and forms an interspace for spacing the perimetric border 120 of the first portion

114 and the nearby edge 123 of the second upper mold part 115; both interspaces allow to provide engineered flash, respectively 118 and 122, which mixes into a single flash to be removed.

The first engineered flash 118, related to the EVA of a first color 114, and the second engineered flash 122, made of an EVA of a second color 117, are made to form within the grooves 119 and 121, which are substantially mirror symmetrical and are open so as to face each other, allowing mixing of EVA in two colors.

Once molding of the article has been completed, it is necessary to proceed with its trimming, in order to eliminate the engineered flash and obtain a perfect outlining of the two colors.

Figures 6 to 10 illustrate a third embodiment of the mold according to the invention, illustrated by way of non-limiting example in the description that follows.

It is stressed first of all that the mold according to the invention is designed to be used during the execution of two subsequent injections of the expansible cross-linking thermoplastic material of different colors within a same mold, with the appropriate replacement of the corresponding lid between the first operation and the second operation; just as usually, during the first of the two injections the temperature of the mold is comprised between 40 and 50 °C, while during the second injection said temperature rises to approximately 180 °C.

In this regard, it is specified that in the accompanying Figures 6 to 10 the material of the first color (injected during the first step of operation) is indicated conventionally with a series of crosses, while the material of the second color (injected during the second step of operation) is indicated conventionally by means of a series of circles.

In particular, Figure 6 is designed to show the cavity M of the mold according to the invention together with the lid C1 used during the injection of the "first color".

Impressions 1a designed to be filled by the injection of the first color and other impressions 1b designed to be filled by the injection of the second color are provided within said cavity. Figure 6 in particular allows to check that the first amount of thermoplastic material actually fills the specific impressions 1a dedicated thereto.

It is important to note that the first lid C1, in addition to providing a perfect hermetic seal all around the impressions 1a of the cavity M, has a central body which protrudes downward 101 and is adapted to be seated exactly within the impressions 1b, which are designed, within the same cavity M, to be subsequently filled with the second injection of thermoplastic material.

Moreover, it should be noted that said cavity M has a perimetric duct 210 which has a U-shaped cross-section and surrounds the impressions 1a, 1b provided thereon.

However, during said operation for injecting the first color this perimetric duct 210 also is perfectly "sealed" by the lower flat face 100 of the lid C1, so that the molding material of this first color cannot reach it in any way.

Figure 7 is instead intended to show the same cavity M provided with the lid C2 used during the injection of the "second color".

At the center of the lid C2 there is usually a large impression 2, which is intended to interface not only with the impressions 1a previously filled with the injection of the first color but also with additional impressions 1b provided within the same cavity M; in particular, the impression 2 of the lid C2 and the impressions 1b of the cavity M form together a single cavity CA which is designed to accommodate the injection of the second color.

The main particularity of this second lid C2 relates to the shape of its lower face, all around the central impression 2.

Indeed, this lower face has a perfectly flat peripheral portion 200, which is intended to abut against the complementarily shaped upper face of

the cavity M, so as to provide a mutual hermetic closure.

Proximate to the central impression 2 there is instead a perimetric duct 220 shaped like an inverted letter U, which is intended to interface exactly, once the lid C2 has been arranged in its operating configuration, with the corresponding U-shaped perimetric duct 210 provided in the cavity M, so as to be able to form together a tubular chamber CT which has a substantially vertical configuration and is capable of acting as a container for collecting the "contaminated" plastic material.

Moreover, the inverted U-shaped duct 220 is blended with the impression 2 of the second lid C2 by way of a sort of intermediate perimetric step 3, at which the lower face of the lid C2 remains spaced with respect to the underlying surface of the cavity M, so that a sort of horizontally arranged slit E, which can be defined appropriately as "engineered flash", forms between them.

When the "second color" is injected at high temperature into a mold thus configured, first of all the central cavity CA is filled; however, at the same time this material interferes with the certainly colder material of the first molding, which stagnates within said appropriately provided impressions 1a of the cavity M.

Such abrasive action (and the consequent removal) that the second material applies to the surface layers of the first material indeed produces the above cited "entrainment" phenomenon, which leads to the interpenetration of the two materials and therefore to the damaging "contamination" of the second color by the first color.

However, in the specific case the particular shape given to the pair constituted by the cavity M and the second lid C2 allows to prevent said inevitable interpenetration of the two materials from occurring within the actual body of the two-color shoe bottom being provided. Indeed, that sort of instant mix that forms between the two materials due to their mutual interpenetration is discharged in succession into said duct having a

horizontal axis F and into the adjacent tubular chamber CT located further outward, which are provided perimetrically with respect to said impressions 1a, 1b, 2 suitable to accommodate respectively the two molding materials.

What is most important to note is that the "mixed" material that is collected within the slot F and within the tubular chamber CT produces, once cross-linking has occurred, a thin flash BA, which is connected to a sort of bead CD which surrounds, along the entire perimeter, the sides of the two-color bottom FB extracted from the mold according to the invention, as shown expressly in Figure 4.

Considering the manner in which it is formed, it can be understood easily that this sort of perimetric tab has an "uncontrolled" hybrid color; however, its presence causes no actual problems, since it can be removed easily and the sides of the two-color bottom FB can be conveniently trimmed, as shown in Figure 10. Rather, it should be noted that the capacity of the slit E and of the adjacent tubular chamber CT within the mold according to the invention is calibrated as a function of the assumed values of the volume increase reported at high temperatures by the expansible cross-linking thermoplastic material.

This refinement is designed to ensure that all of the above cited "mix" of the two different colors can collect within said tubular "discharge" chamber CT and prevent said unwanted interpenetration thereof from being produced also at the sides of the two-color bottom being formed.

Moreover, it is specified that while not abandoning the present inventive concept, nothing prevents the provision of an alternative version of the mold, within which there is only the parametric slit F and the adjacent and outermost tubular chamber CT is not provided.

As further alternatives, the tubular chamber CT into which the horizontal perimetric slot E leads can be provided entirely at the lower face of the lid of the second color C2 or be provided entirely at the upper face of the cavity M.

Also with reference to this tubular chamber CT, it should be noted finally that even though it has a substantially elliptical cross-section in the accompanying figures, nothing prevents it from having any different shape, such as for example circular, oval, et cetera.

In practice it has been found that the invention thus described solves the problems noted in the above cited known method and apparatus for molding articles made of two-color EVA.

It has in fact been found that the present invention has provided a method which is more efficient and economical than the known method.

In particular, the present invention provides an apparatus which allows to space the hot part, i.e., the edge 23 and 123, of the second upper mold part 15 and 115, from the upper border 20 and 120 of the first portion 14 and 114 molded previously, reducing the likelihood of its melting; if melting occurs also for the upper border 20 of the first portion 14 in the first embodiment of Figure 3, said portion can flow and collect in the groove 19 for the engineered flash 18.

Further, the groove 19 and the lateral arrangement of the engineered flash 18 also allows to cover any irregularities of the border 20 of the first portion 14.

Moreover, the apparatus according to the invention facilitates the filling of the impressions to form the various portions made of EVA, allowing to use an excess of material to achieve complete filling of the mold.

Further, the present invention provides an apparatus which requires lower mold closure pressures with respect to the pressures required by the test machines being cited above; in this regard, the apparatus according to invention allows to provider molding machines which are cheaper than the ones tested.

Moreover, the present invention provides an apparatus and a method which can be manufactured cheaply with known systems and technologies.

The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

In practice, the materials employed, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and to the state of the art.

The disclosures in Italian Patent Applications No. MC2006A000098 and No. PD2006A000314 from which this application claims priority are incorporated herein by reference.

CLAIMS

1. A method for molding multicolor articles made of ethyl vinyl acetate, comprising the steps of:

– injecting into a first impression (11), formed by a lower mold part (12) and a first upper mold part (13), EVA of a first color to mold a first portion (14) of a multicolor article to be obtained, said lower mold part (12) and said first upper mold part (13) being at a temperature which is lower than the melting point of EVA;

– opening the mold;

– closing said lower mold part (12) with a second upper mold part (15) which has a higher temperature than the EVA cross-linking temperature, in order to form a second impression (16) which is complementary to the first one and is adapted to provide a second portion (17) of the article to be obtained;

– injecting EVA of a second color to overmold on said first portion (14) said second portion (17) of the article to be provided, and simultaneously heating said lower mold part (12) to a temperature which is higher than the cross-linking temperature;

– once cross-linking has been completed, opening the mold and extracting the article.

2. The method according to claim 1, characterized in that said temperature below the EVA melting point is between 60° and 100 °C.

3. The method according to the preceding claims, characterized in that said temperature higher than the EVA cross-linking temperature is comprised between 160 and 190 °C.

4. The method according to one or more of the preceding claims, characterized in that the EVA of a first color is injected into said first impression (11) at a temperature comprised between 80 and 110 °C.

5. The method according to one or more of the preceding claims, characterized in that the EVA of a second color is injected into said second

impression (16) at a temperature comprised between 80° and 110 °C.

6. An apparatus for molding multicolor articles made of ethyl vinyl acetate, comprising a mold which is composed of a lower mold part (12), a first upper mold part (13) and a second mold part (15) to be arranged on the lower mold part to form respectively a first impression (11) and a second impression (16), which is complementary to the first impression, said apparatus being characterized in that at least one of said mold parts (12, 13, 15) is shaped so as to form, together with its complementary mold part, flash (18) around the corresponding impression.

7. The apparatus according to claim 6, characterized in that said second upper mold part (15) has a groove (19) which extends perimetrically with respect to the respective impression (16) and forms a spacing interspace between the perimetric border (20) of a first portion (14) provided in said first impression (11) and the adjacent edge (23) of said second upper mold part (15), said interspace being suitable to provide engineered flash (18).

8. The apparatus according to claim 6, characterized in that said lower mold part (112) and said upper mold part (115) each have a groove (119, 121) which runs perimetrically with respect to the respective impression (111, 116) and forms an interspace for spacing between the perimetric border (120) of a first portion (114), which is provided in said first impression (111), and the adjacent edge (123) of said second upper mold part (115), each interspace being adapted to provide engineered flash (118, 122).

9. The apparatus according to claim 8, characterized in that a first engineered flash (118) related to the EVA of a first color and the second engineered flash (122) of EVA of a second color are made to form in said grooves (119, 121) which are substantially mirror-symmetrical and open so that they face each other, so as to allow the mixing of the EVA of two colors.

10. A mold for forming a two-color bottom for shoes made of expansible cross-linking thermoplastic material, of the type constituted by a cavity (M) in which at least the impressions (1a) of the first color are provided, by a lid of the "first color" (C1) and by a lid of the "second color" (C2) provided with an impression (2), the lid of the second color (C2) having, all around the respective impression (2), a step (3) at which its lower face remains spaced with respect to the underlying upper face of the cavity (14), so as to form a thin horizontal slit (E) which leads into its said impression (2).

11. The mold according to claim 10, characterized in that said perimetric horizontal slit (F) which forms between the lid of the second color (C2) and the cavity (M) leads at a tubular chamber (CT) located further outward.

12. The mold according to claim 11, characterized in that said tubular chamber (CT) is formed by way of the perfect interfacing of a half-chamber (220), provided at the lower surface of the lid of the second color (C2), with a complementarily shaped half-chamber (210) provided at the upper surface of the cavity (M).

13. The mold according to claim 12, characterized in that the half-chamber (220) provided on the lid of the second color (C2) consists of a small duct which has an inverted U-shaped cross-section, while the half-chamber (210) provided on the cavity (M) consists of a small duct which has a corresponding U-shaped cross-section.

14. The mold according to claim 11, characterized in that said tubular chamber (CT) is provided entirely at the lower surface of the lid of the second color (C2).

15. The mold according to claim 11, characterized in that said tubular chamber (CT) is provided entirely at the upper surface of the cavity (M).

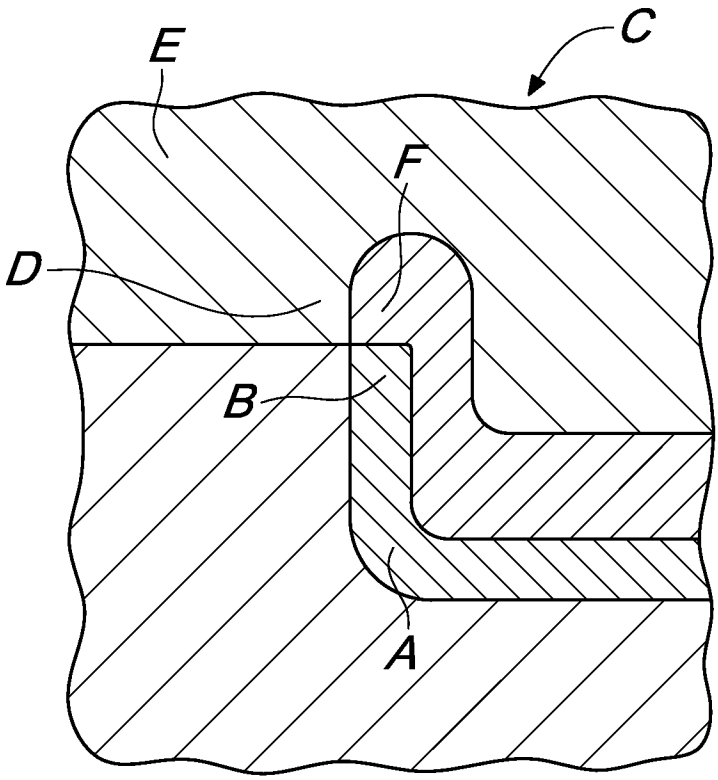


Fig. 1

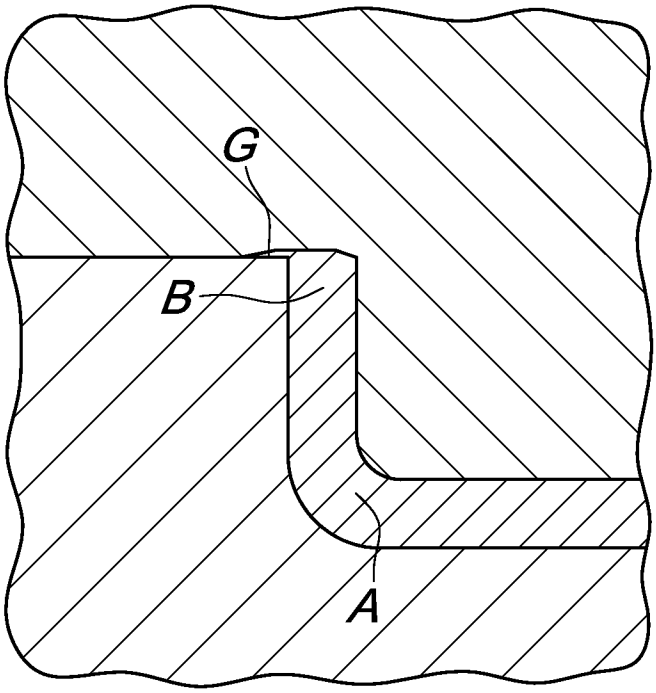


Fig. 2

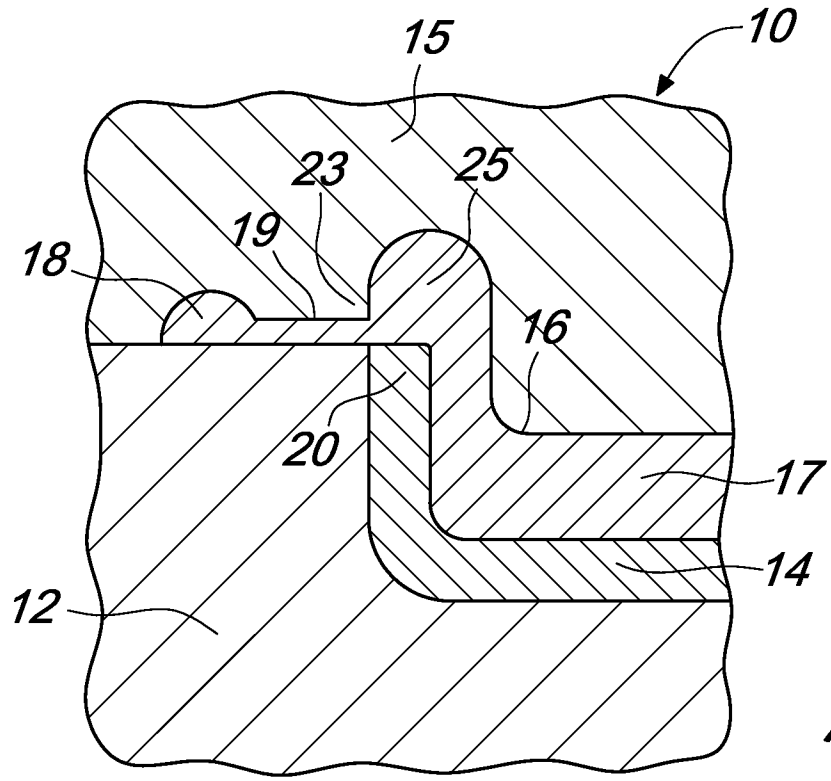

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Fig. 3

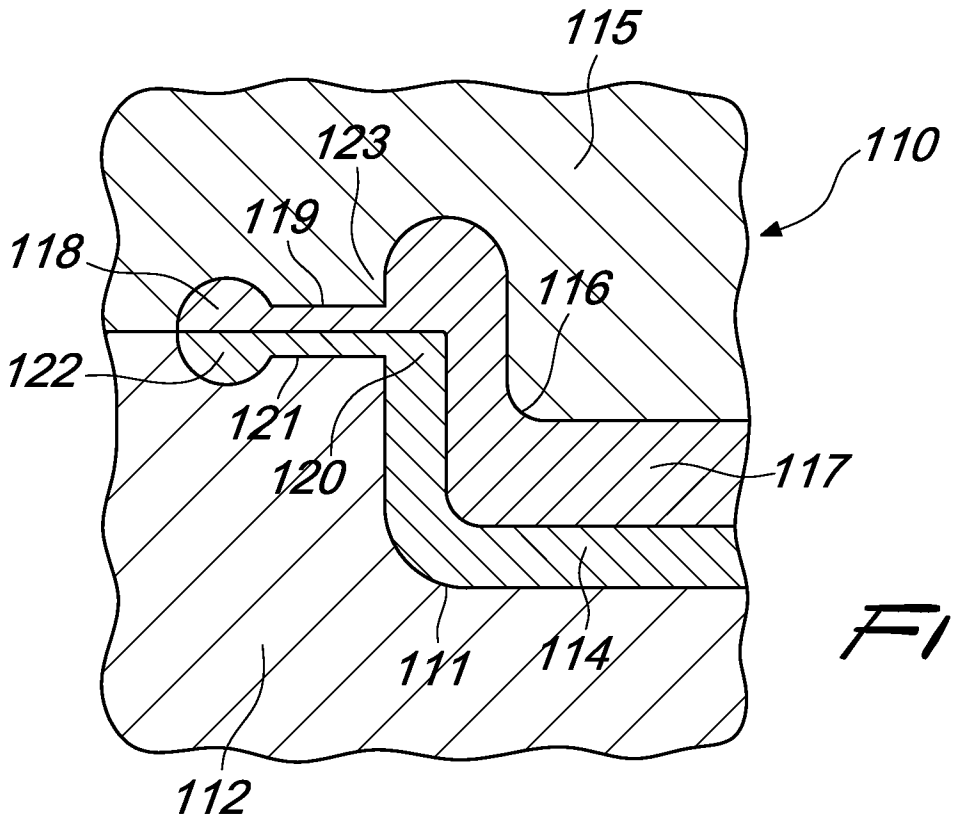

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Fig. 4

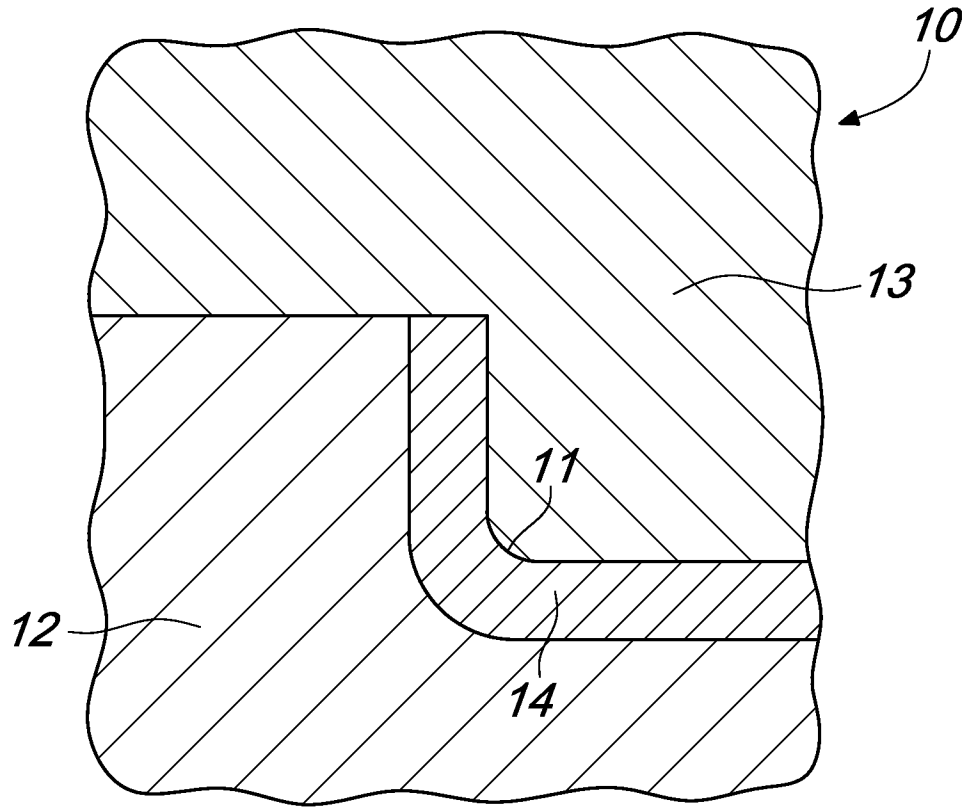


Fig. 5

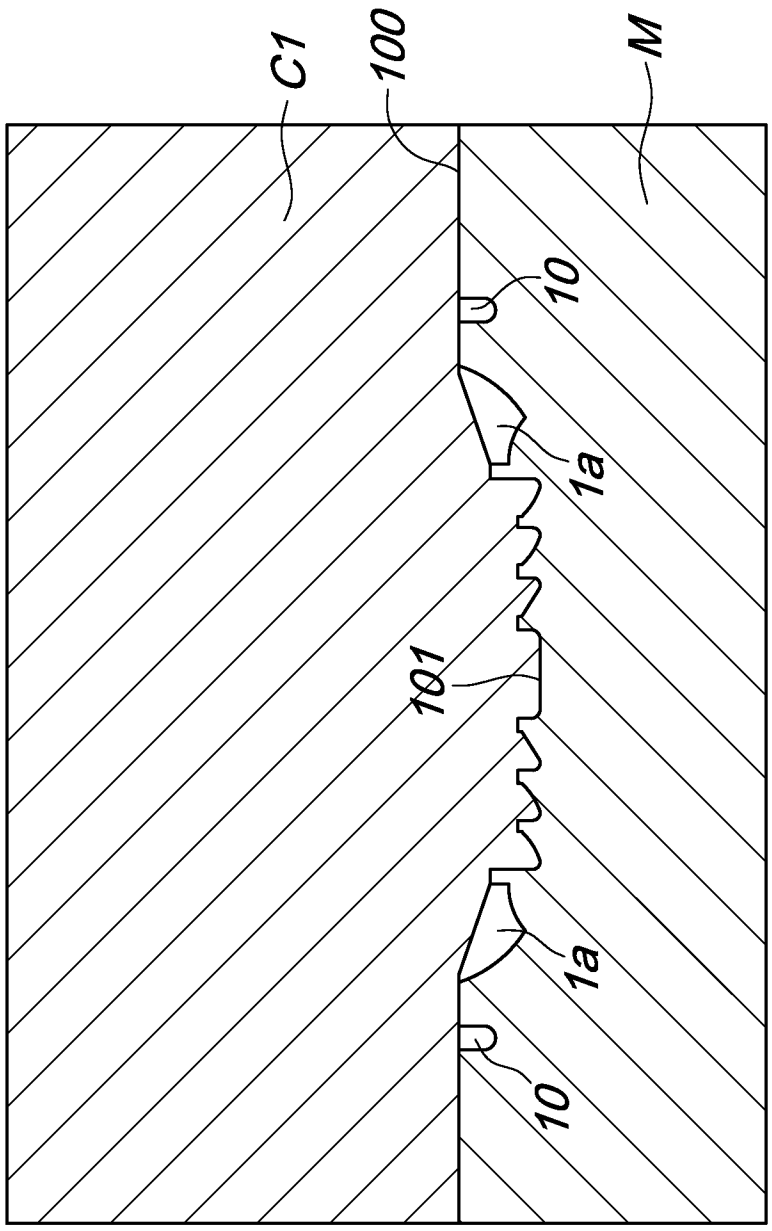


Fig. 6

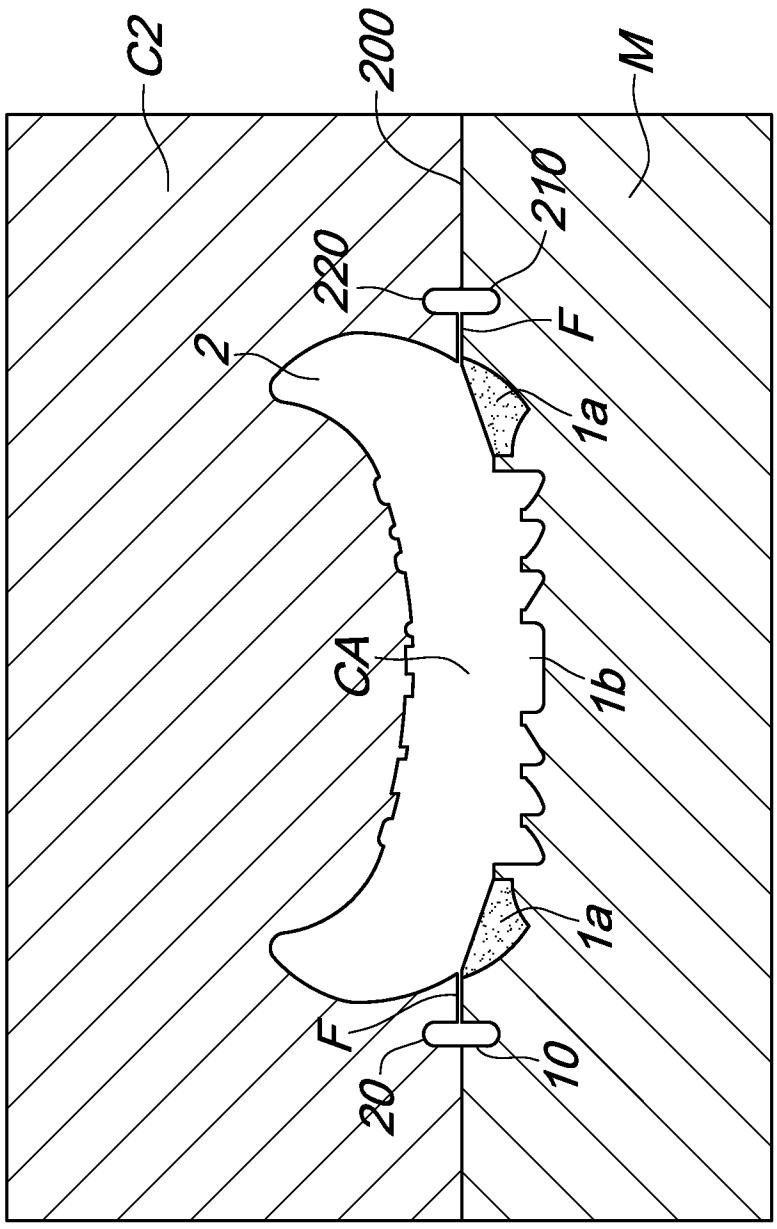


Fig. 7

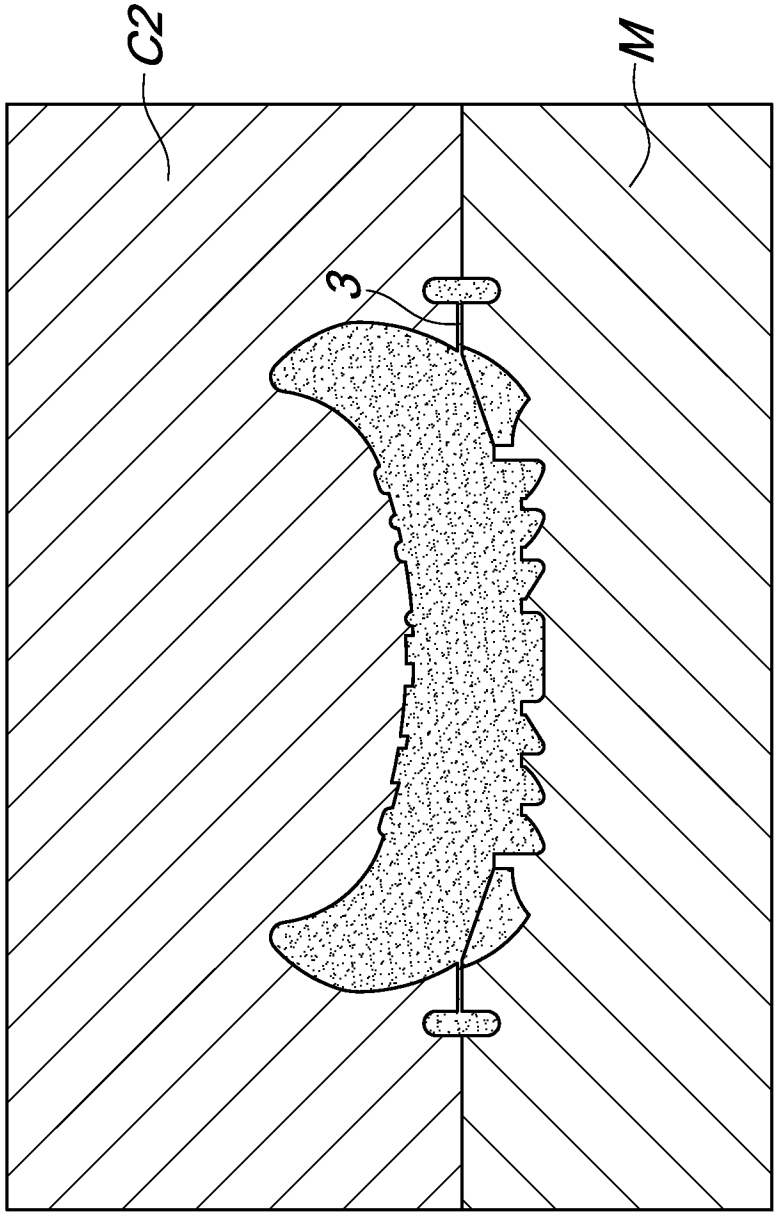


Fig. 8

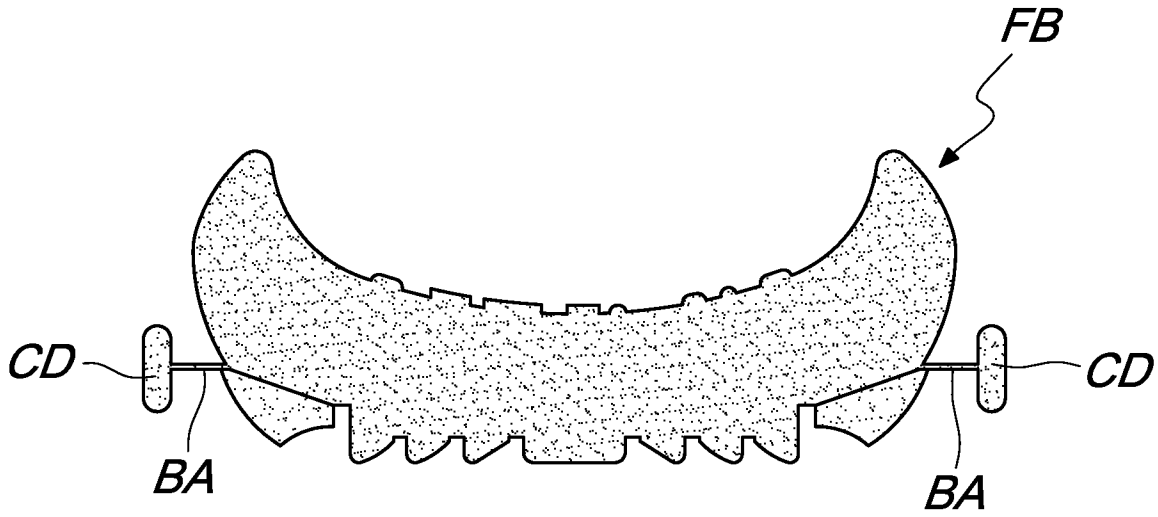


Fig. 9

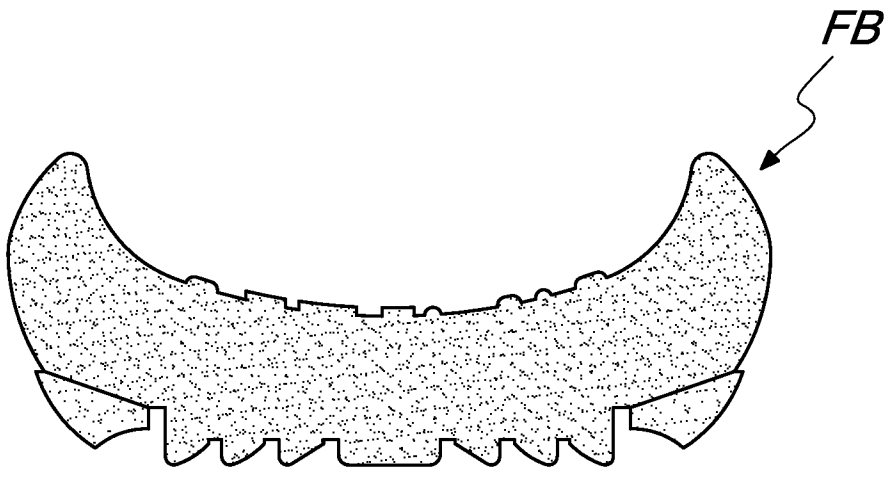


Fig. 10