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(54) A WASHING MACHINE

WASCHMASCHINE

LAVE-LINGE

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Description

[0001] The present invention relates to a washing machine with increased washing performance wherein the washed laundry is prevented from wearing out.

[0002] Washing machines, particularly the front loading washing machines with horizontal axis, comprise a tub situated inside a body and a perforated drum that provides washing of the laundry by rotating in the tub. In order to load the laundry into the drum, openings are provided on the front walls of the body, tub and drum that overlap with each other. These openings are covered by a lid located on the body. A bellows disposed at the region where the opening is situated between the tub and the front wall of the body provides the washing liquid and the laundry inside the tub to stay in the drum. The bellows, by means of its resilient configuration, provides leak-proofing effectively between the front wall of the body and the tub that moves by the motion of the drum rotating inside during the washing and spin-drying processes. During the washing process, the laundry gets into the bellows or in between the lid and the bellows and wear out. In order to solve this problem, the lid comprises a frustoconically shaped transparent lid that extends from the front wall of the body into the drum. The transparent lid keeps the laundry away from the bellows and prevents them from getting caught inside the bellows and wearing out. By the arrangements performed on the surface of the transparent lid, a better mixing of the laundry is tried to be provided and the washing performance is tried to be improved.

[0003] In the state of the art German Patent Application No. DE10228602, washing machines are described comprising a frustoconical transparent lid that extends into the drum. The transparent lid has a conical edge and an inclined front side. The surface of the front side is produced in a knurled structure in order to improve the washing performance and provide the laundry to mix better.

[0004] In the state of the art International Patent Application No. WO2008000592, a washing machine is described comprising a frustoconical transparent cover that extends into the drum and that has a crescent-shaped inclined surface surrounding its outer surface by rotating from the level wherein the diameter of the cover has the greatest value up to the level wherein the diameter of the cover has the smallest value.

[0005] US 3 276 229 A discloses a front-loading washing machine with a door comprising a window which extends into a corresponding opening of a drum when the door is closed. The window comprises an inclined and curved central portion.

[0006] A similar front-loading washing machine is known from EP 2 147 996 A1.

[0007] The aim of the present invention is the realization of a washing machine which comprises a lid that improves the washing performance.

[0008] In the washing machine realized in order to attain the aim of the present invention, explicated in the first claim and respective claims thereof, the transparent lid extends from the front wall into the drum and the tub when the lid is closed.

[0009] The side, facing the inside of the drum, of the transparent lid, which extends into the drum when the lid is closed, has an inclined form. This inclined form has a progressive configuration which is provided not by a single inclined plane but by positioning more than one inclined plane one above the other. Thus, the surface where the laundry inside the drum contacts the transparent lid during washing is increased and the washing effectiveness is improved. Furthermore, the laundry is also provided to mix better.

[0010] A ring-shaped skirt, which is seated into the frame, is located on the edges of the transparent lid. The conical portion forming the body of the transparent lid extends from the skirt and provides the transparent lid to extend into the tub when the lid is closed. The front side of the transparent lid facing the drum inner volume has a progressive-inclined configuration from the top downwards. In other words, the transparent lid extends into the tub at most at the lower end.

[0011] According to claim 1, the front side comprises inclined surfaces and connection surfaces that are ordered one after another such that an inclined surface extends into the body, a connection surface extends from the lower end of this inclined surface towards the reverse direction and another inclined surface extends from the end of the connection surface into the body again. Thus, a progressive-inclined form such as a pine tree consisting of triangles that are added under one another is provided. This progressive-inclined configuration provides the washing effectiveness to be improved by increasing the interaction of the laundry with the transparent lid during washing.

[0012] In an embodiment of the present invention, the inclined surfaces are equiangular with respect to the horizontal axis and are positioned progressively.

[0013] In another embodiment of the present invention, the inclination of the inclined surfaces increases at each step from the top downwards. In other words, out of two consecutive inclined surfaces, the angle of the upper one with the horizontal axis is greater than the angle of the lower one with the horizontal axis.

[0014] For example, in the embodiment with three consecutive inclined surfaces, the lowermost inclined surface that has the smallest angle with the horizontal axis provides the laundry to be mixed and the washing to be improved in cases a few laundry is loaded in the drum. Similarly, together with the other inclined surfaces, the inclined surface in the middle step contributes to the mixing of all laundry in case that the washing machine has an average amount of load, and the inclined surface in the uppermost step having the greatest angle with the horizontal axis in case that the washing machine has the highest amount of load.

[0015] The model embodiments that relate to the

washing machine realized in order to attain the aim of the present invention are illustrated in the attached figures, where:

Figure 1 - is the schematic view of a washing machine when the lid is closed.
Figure 2 - is the schematic view of a washing machine when the lid is open.
Figure 3 - is the front perspective view of the transparent lid.
Figure 4 - is the rear perspective view of the transparent lid.
Figure 5 - is the sideways view of the transparent lid.

[0016] The elements illustrated in the figures are numbered as follows:

1. Washing machine
2. Body
3. Tub
4. Drum
5. Loading port
6. Lid
7. Front wall
8. Frame
9. Transparent lid
10. Drum opening
11. Tub opening
12. Bellows
13. Skirt
14. Conical surface
15. Front side
16. 116. 216. Inclined surface
17. Connection surface

[0017] The washing machine (1) comprises a body (2) having a front wall (7), a tub (3) in which the washing process is performed, a drum (4) which is disposed inside the tub (3) and into which the laundry to be washed is placed, a loading port (5) which is located on the front wall (7) and provides access into the tub (3) and the drum (4), and a lid (6) covering the loading port (5).

[0018] The lid (6) comprises a frame (8) and a transparent lid (9) that is disposed in the center of the frame (8) and that extends from the loading port (5) into the drum (4).

[0019] The washing machine (1) is of front-loading type with a horizontal axis.

[0020] The washing machine (1), furthermore, comprises a tub opening (11) that corresponds to the loading port (5) and that is located on the tub (3) surface facing the front wall (7), a drum opening (10) that corresponds to the loading port (5) and the tub opening (11) and that is located on the drum (4) surface facing the front wall (7), and a bellows (12) with one end attached to the side of the tub opening (11) and the other to the side of the front wall (7), that provides the leak-proofing between the front wall (7) and the tub (3), which moves with the motion of the rotating drum (4), by means of its resilient configuration.

[0021] The loading port (5), the tub opening (11) and the drum opening (10) are all circular. The transparent lid (9) has a frustoconical shape.

[0022] When the lid (6) is closed, the frame (8) bears against the front wall (7) and the transparent lid (9) enters into the drum (4) and the tub (3) through the front wall (7). When the lid (6) is closed, the portion of the transparent lid (9) aligned with the drum opening (10) has a progressive-inclined form.

[0023] By means of the transparent lid (9) portion, which is aligned with the drum opening (10) when the lid (6) is closed, being progressive-inclined, the rubbing effect on the laundry is increased and the washing performance is improved. Furthermore, an effective mixing is provided by contributing to the movement of the laundry inside the drum (4).

[0024] The transparent lid (9) comprises a skirt (13) which is seated into the frame (8), a conical surface (14) shaped as a truncated cone which enables the transparent lid (9) to enter into the tub (3) when the lid (6) is closed by extending from said skirt (13), and a progressive-inclined front side (15) which covers the truncated side of the transparent lid (9) and remains aligned with the drum opening (10) when the lid (6) is closed. When the lid (6) is closed, the front side (15) is inclined from the top downwards such that the upper end of the transparent lid (9) extends from the wall (7) into the drum (4) less and the lower end more. In other words, the height of the conical surface (14) is more at the bottom and less at the top.

[0025] In the preferred embodiment of the present invention, the front side (15) comprises more than one inclined surface (16, 116, 216) that are ordered one after another from the top downwards in a truncated manner. Thus, the contact of the laundry to the front side (15) during washing is increased and the washing performance is improved. In this embodiment, the front side (15) comprises connection surfaces (17) that form a stepped configuration by joining the consecutive inclined surfaces (16, 116, 216) so as to form a recess in the horizontal plane in the direction opposite to the inclination direction.

[0026] In an embodiment of the present invention, the angles of the inclined surfaces (16, 116, 216) with the horizontal plane are equal to each other and the inclined surfaces (16, 116, 216) are ordered progressively from the top downwards.

[0027] In another embodiment of the present invention, the angle of the consecutive inclined surfaces (16, 116, 216) with the horizontal axis decreases from the top downwards. In other words, out of two consecutive inclined surfaces (16, 116), the angle of the upper inclined surface (16) with the horizontal axis (α, β) is greater than the angle of the lower inclined surface (116) with the horizontal plane (α, β). Thus, a surface which is gradually more perpendicular from the bottom upwards is obtained and the laundry is provided to be mixed effectively even in case of increased amount of laundry.

[0028] In an embodiment of the present invention, the front side (15) comprises three consecutive inclined surfaces (16). In this embodiment, the lowermost first inclined surface (16) is the surface that makes the smallest angle (γ) with the horizontal axis, and contacts the laundry when a small amount of laundry is loaded into the drum (4) and provides the laundry to be mixed effectively. The second inclined surface (116) that is located in the middle has a greater angle (β) with the horizontal axis. When an average amount of laundry is loaded into the drum (4), the first and the second inclined surface (116) contact the laundry and provide the laundry to be mixed effectively. The uppermost third inclined surface (216) has the greatest angle (α) with the horizontal axis and hence enables the laundry to be mixed effectively even when a high amount of laundry is loaded into the drum (4).

[0029] It is to be understood that the present invention is not limited by the embodiments disclosed above and a person skilled in the art can easily introduce different embodiments. These should be considered within the scope of the protection postulated by the claims of the present invention.

Claims

1. A washing machine (1) comprising a body (2) that has a front wall (7), a tub (3) in which the washing process is performed, a drum (4) that is disposed inside the tub (3), into which the laundry to be washed is placed, a loading port (5) that is located on the front wall (7) and that provides access into the tub (3) and the drum (4), a lid (6) that covers the loading port (5) and that has a transparent lid (9) which extends from the loading port (5) into the drum (4) when the lid (6) is closed, and a drum opening (10) that is located on the drum (4) and that corresponds to the loading port (5), wherein the portion of the transparent lid (9) aligned with the drum opening (10) has a progressive-inclined form, and the transparent lid (9) comprises a frustoconical skirt (13) which is seated into the frame (8), a conical portion (14) which enables the transparent lid (9) to enter into the tub (3) when the lid (6) is closed by extending from said skirt (13), and a front side (15) which is progressive-inclined from the top downwards and which remains aligned with the drum opening (10) when the lid (6) is closed, **characterized in that** the front side (15) comprises more than one inclined surface (16, 116, 216) that are ordered one after another from the top downwards in a truncated manner, and connection surfaces (17) that form a stepped configuration by joining the consecutive inclined surfaces (16, 116, 216) so as to form a recess in the horizontal plane in the direction opposite to the inclination direction.

2. A washing machine (1) as in Claim 1, **characterized in that** the inclined surfaces (16, 116, 216) are ordered progressively from the top downwards and the angles with the horizontal axis of which are equal to each other.

3. A washing machine (1) as in Claim 1, **characterized in that** the front side (15) gradually becomes more perpendicular upwards.

4. A washing machine (1) as in Claim 3, **characterized in that** out of two consecutive inclined surfaces (16, 116) of the transparent lid (9), the angle of the upper inclined surface (16) with the horizontal axis (α, β) is greater than the angle of the lower inclined surface (116) with the horizontal plane (β, γ).

Patentansprüche

1. Waschmaschine (1), umfassend einen Gehäusekörper (2) mit einer Stirnwand (7); einem Waschbehälter (3), in dem der Waschvorgang durchgeführt wird; einer Trommel (4), die im Inneren des Waschbehälters (3) angeordnet ist und in die die zu waschende Wäsche gelegt wird; einer Ladeöffnung (5), die an der Stirnwand (7) angeordnet ist und Zugang zum Waschbehälter (3) und der Trommel (4) bietet; einem Deckel (6), der die Ladeöffnung (5) abdeckt und einen transparenten Deckel (9) aufweist, der sich von der Ladeöffnung (5) in die Trommel (4) erstreckt, wenn der Deckel (6) geschlossen ist; und einer Trommelöffnung (10), die an der Trommel (4) angeordnet ist und mit der Ladeöffnung (5) übereinstimmt, wobei der Abschnitt des transparenten Deckels (9), der mit der Trommelöffnung (10) übereinstimmt, eine progressiv geneigte Form aufweist und der transparente Deckel (9) eine kegelstumpfförmige Einfassung (13), die im Rahmen (8) sitzt, einen kegelförmigen Abschnitt (14), der es dem transparenten Deckel (9) ermöglicht, in den Waschbehälter (3) zu treten, wenn der Deckel (6) geschlossen ist, indem er sich von der Einfassung (13) aus erstreckt, und eine Stirnseite (15) umfasst, die von der Oberseite nach unten progressiv geneigt verläuft und in Übereinstimmung mit der Trommelöffnung (10) bleibt, wenn der Deckel (6) geschlossen ist, **dadurch gekennzeichnet, dass** die Stirnseite (15) mehrere geneigte Flächen (16, 116, 216), die nacheinander in kegelstumpfartiger Weise von oben nach unten angeordnet sind, und Verbindungsflächen (17) umfasst, die eine gestufte Konfiguration bilden, indem sie die aufeinander folgenden geneigten Flächen (16, 116, 216) verbinden, derart, dass eine Vertiefung in der horizontalen Ebene entgegengesetzt zur Neigungsrichtung gebildet wird.

2. Waschmaschine (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die geneigten Flächen (16, 116, 216) progressiv von oben nach unten angeord-

net sind und die Winkel zur horizontalen Achse derselben gleich sind.

3. Waschmaschine (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Stirnseite (15) nach oben hin allmählich senkrechter wird.

4. Waschmaschine (1) nach Anspruch 3, **dadurch gekennzeichnet, dass** von zwei aufeinander folgenden geneigten Flächen (16, 116) des transparenten Deckels (9) der Winkel der oberen geneigten Fläche (16) zur horizontalen Achse (α, β) größer als der Winkel der unteren geneigten Fläche (116) zur horizontalen Ebene (β, γ) ist.

Revendications

1. Une machine à laver (1) comprenant un corps (2) qui présente une paroi avant (7), une cuve (3) dans laquelle le processus de lavage est réalisé, un tambour (4) qui est disposé dans la cuve (3) et dans lequel le linge à laver est placé, un orifice de chargement (5) qui est situé sur la paroi avant (7) et qui permet l'accès dans la cuve (3) et le tambour (4), une porte (6) qui couvre l'orifice de chargement (5) et qui a une porte transparente (9) s'étendant de l'orifice de chargement (5) dans le tambour (4) lorsque la porte (6) est fermée, et une ouverture de tambour (10) qui est située sur le tambour (4) et qui correspond à l'orifice de chargement (5), où la partie de la porte transparente (9) alignée avec l'ouverture de tambour (10) a une forme graduelle inclinée et la porte transparente (9) comprend une collerette tronconique (13) qui est placé dans le cadre (8), une partie conique (14) qui permet à la porte transparente (9) d'entrer dans la cuve (3) lorsque la porte (6) est fermée en s'étendant de ladite collerette (13), et un côté avant (15) qui a une forme graduelle inclinée de haut en bas et qui reste alignée avec l'ouverture de tambour (10) lorsque la porte (6) est fermée, **caractérisée en ce que** le côté avant (15) comprend plus d'une surface inclinée (16, 116, 216) arrangée l'une après l'autre dans une manière tronquée, et des surfaces de raccordement (17) qui forment une forme étagée en joignant les surfaces inclinées (16, 116, 216) consécutives afin de former un évidement dans le plan horizontal dans la direction opposée à la direction d'inclinaison.

2. Une machine à laver (1) selon la Revendication 1, **caractérisée en ce que** les surfaces inclinées (16, 116, 216) sont arrangées graduellement de haut en bas et que les angles entre celles-ci et l'axe horizontal sont égaux les unes aux autres.

3. Une machine à laver (1) selon la Revendication 1, **caractérisée en ce que** le côté avant (15) devient graduellement plus perpendiculaire vers le haut.

4. Une machine à laver (1) selon la Revendication 3, **caractérisée en ce que** sur les deux surfaces inclinées consécutives (16, 116) de la porte transparente (9), l'angle de la surface inclinée supérieure (16) avec l'axe horizontal (α, β) est plus large que l'angle de la surface inclinée inférieure (116) avec le plan horizontal (β, γ).

Figure 1

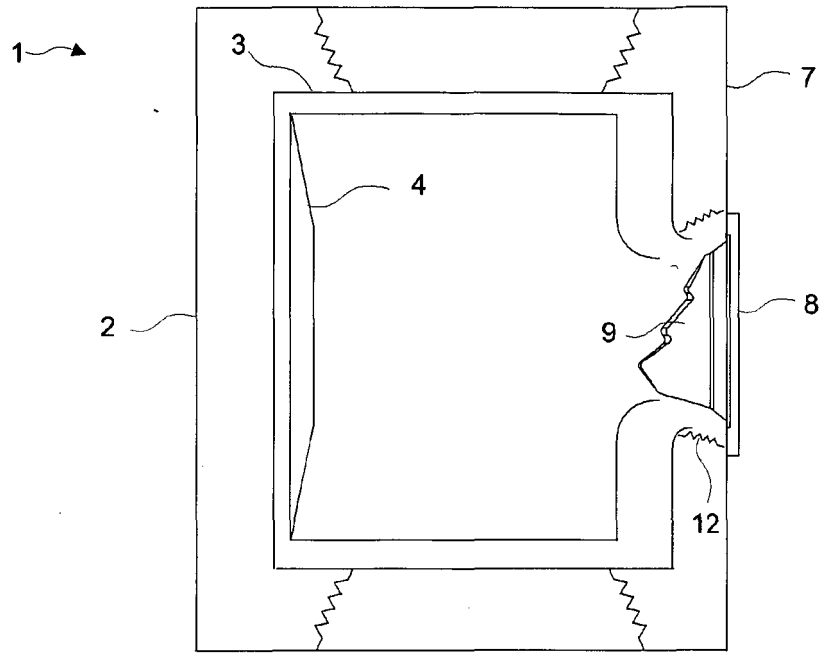


Figure 2

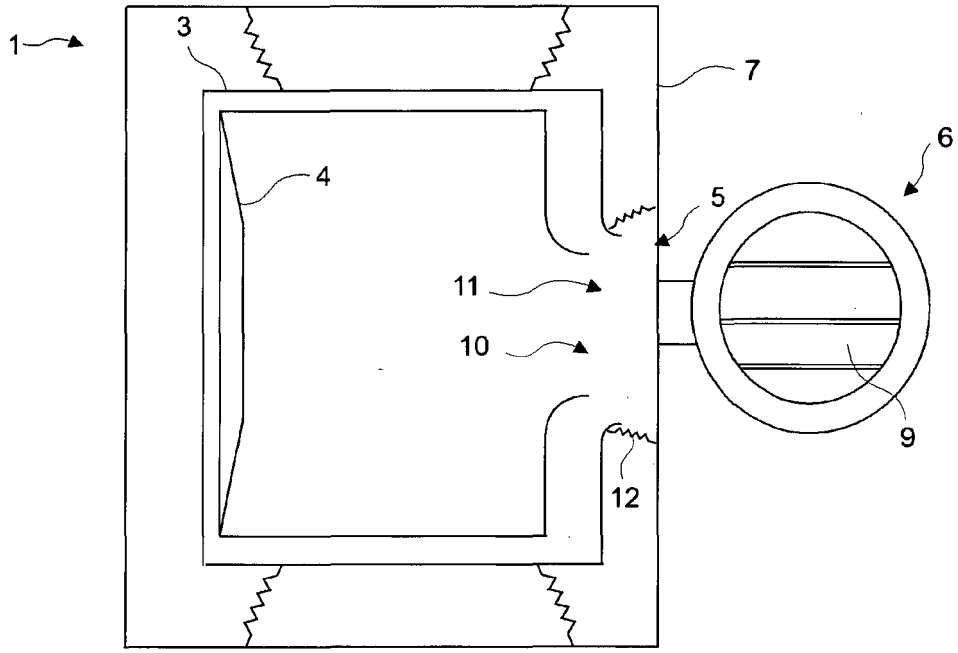


Figure 3

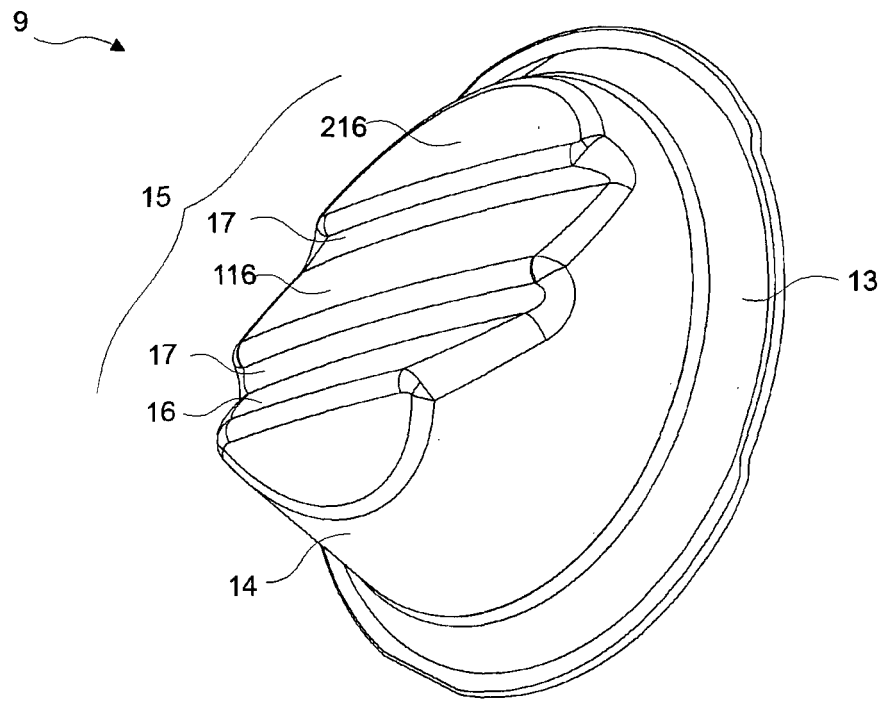


Figure 4

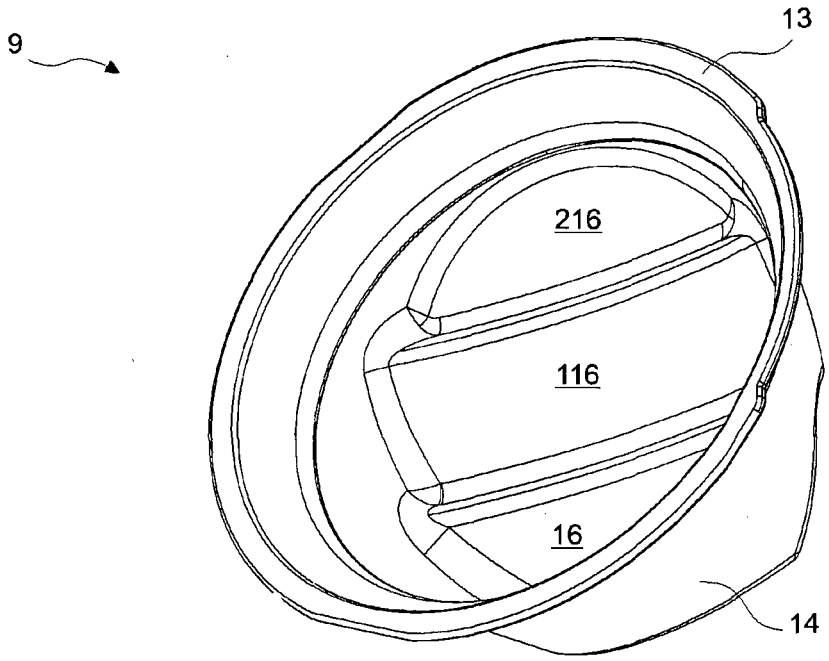
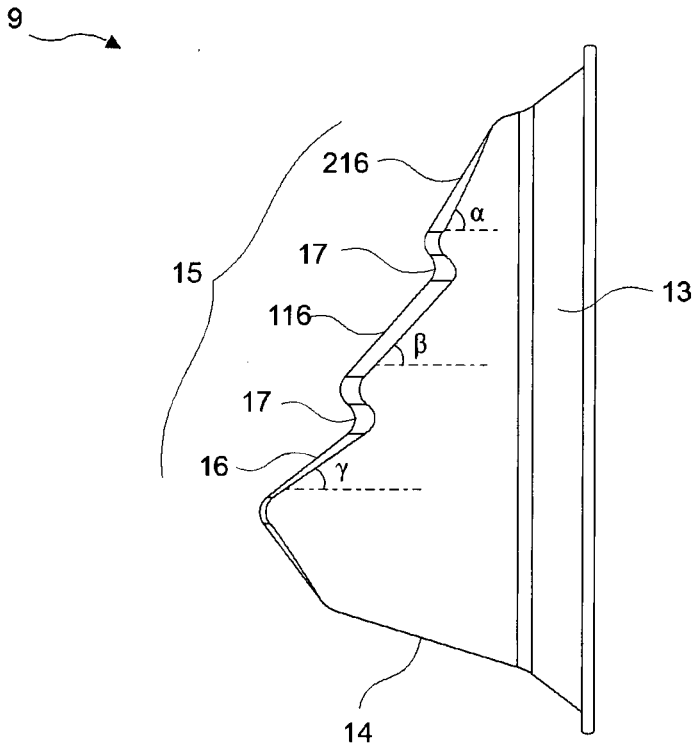


Figure 5



REFERENCES CITED IN THE DESCRIPTION

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