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(54) **Set comprising a ring, a foil and a lid, a preset therefor, a method for producing a set, and a method for producing a container**

Satz aus einem Ring, einer Folie und einem Deckel, vormontierter Satz, Verfahren zur Herstellung eines Satzes, sowie Verfahren zur Herstellung eines Behälters

Ensemble comportant un anneau, une feuille et un couvercle, ensemble préassemblé, procédé de production d'un ensemble, et procédé de production d'un récipient

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WO-A-97/25255
FR-A- 789 556
GB-A- 164 459
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GB-A- 191 107 562
NL-C2- 1 013 957

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Description

[0001] The invention relates to a set for closing a container body, comprising a ring, a foil and a lid, wherein the foil is adhered to the ring, to a preset comprising a ring, a foil and a lid wherein the foil is not yet adhered to the ring, to a method for producing the set comprising the ring, the lid and the foil adhered to the ring, and finally to a method for producing a container.

[0002] Containers according to the present invention should have an optimal airtight closure due to their content and to their use under conditions which when in open contact with the container content results in an accelerated degradation of the content. Therefore the container body is provided with a ring determining an opening and this opening is closed off by a foil adhered to the container. The foil may be peeled off using a foil tab. The container is furthermore provided with a metal lid covering the foil. Accordingly, the lid protects the foil against undesired breakage. However, the container is furthermore tamper proof and reduces a risk for unwanted additions to the content of the container.

[0003] One type of such containers comprises a foil which is seamed into the seam formed between a ring curl and a curl of the container body. Such type of container is called a PAL container.

[0004] Another type of container comprises a peelable foil which is sealed to an horizontal ring part. The lid closes over the foil and onto the ring and is often provided with arresting means (a circumferential bead or dimples) avoiding an undesired release of the lid from the ring. Such container is often called a PALOS container.

[0005] Another type of container comprises a peelable foil which is sealed to the ring and a plastic lid or cap overcloses foil and ring and is connected to the container seam. Such container is often called an easy opening container.

[0006] It will be appreciated that the PAL container requires a tool for getting access to the content of the container. The PAL container is optimally reclosable and is of high safety against unwanted additions to the container content. However, the manufacturing costs of the PAL container are relatively high.

[0007] The PALOS container also requires a tool for breaking the foil and getting access to the container content. The PALOS container is less optimally reclosable but has the same safety properties. Manufacturing costs are even higher than those of the PAL container.

[0008] The container has the optimal properties for opening by tearing off the foil using the foil tab. The container is only reclosable by using the additional plastic cap overclosing the ring and connected to the body seam. Safety is reduces but manufacturing costs are relatively low.

[0009] The present invention has for its object to provide a container which has optimal opening properties similar to those of the pealable closure container. Furthermore, reclosability should be optimal and manufacturing costs relatively low.

[0010] GB07562A discloses a container comprising a body provided with a ring determining an opening, a foil closing the opening, and a lid covering the foil and is connected to the ring. The ring and the lid are resiliently connected and the foil is adhered to the ring in a resilient connection between the ring and the lid.

[0011] FR 789 556 A discloses a similar container having a ring fixed to the container body. A foil is placed over the ring and another ring having a stopper is pressed into the ring opening.

[0012] WO 97/25255 A disclosed a so-called PAL container, in which the foil is connected to the ring and interposed between the ring and the container body. The foil is not adhered to the ring in a resilient connection between the ring and the lid. WO 97/25255 A discloses the features of the preamble of claim 1.

[0013] The invention provides a set for a container as claimed in claim 1.

[0014] The gist of the invention resides in the formation of a set comprising the ring and the lid and the foil being interposed between the ring and the lid which have a mutual resilient connection and thereby resiliently maintaining the foil between ring and lid. The foil is provided with sealing material such that by application of heat the foil is adhered to the ring while being present and resiliently pressed in placed between the lid and ring.

[0015] Accordingly, less foil material and thinner foil (such as less than 100 μm, in particular 70 μm) for reasons that in view of the PALOS container the foil is no longer seamed in between the ring curl and the body curl. At the same time less foil material is required due to the smaller diameter. A material reduction is estimated to about 10%.

[0016] Furthermore, the ring and lid could be made of thinner material for reasons that in the resilient connection material sizes are less critical. Finally, due to the resilient connection between ring and lid, the foil is maintained in the preset between ring and lid and this preset could be subjected to the heat treatment using an oven. Accordingly, it is not required to use a particular sealing apparatus comprising sealing means which only temporarily contact ring and/or lid in a position where the foil is to be adhered to the ring by application of heat. Accordingly, the production rate may be increased while using standard equipment.

[0017] According to a preferred embodiment the resilient connection has a contact area which is at an angle of 45-100°, preferably 45-90°, more preferably 75-90° with the axial direction of the container. Selecting the contact area within the range of 45-100°, preferably within 45-90° and more preferably between 75-90° with the (horizontal) plane defined by the ring results in less force required for removing the lid out of the resilient connection. For reasons that only a force slightly higher than the friction force is to be applied. Larger the contact angles will result in a lower fraction of the normal force for the resilient connection to be compensated. At an angle of

90° the normal force of the resilient connection in a direction of releasing the lid from the ring is very low if present at all. Under those circumstances it is only the friction force which is experienced by the consumer when removing the lid from the ring. The resilient force required for the resilient connection may originate from the lid part or from the ring part, or from both parts. Preferably both parts are resilient such that the sizes and measures of these parts are less critical.

[0018] The resilient property in the resilient part of the lid and/or ring is obtained by deforming these parts to 0.2% of their yield point.

[0019] For optimally maintaining the foil between the ring and the lid it is preferred that the resilient connection has a surface pressure within the range of 600-1300N/cm^2, preferably 700-1200N/cm^2. Accordingly, under practical conditions the resilient connection complies with the manufacturing, handling and user requirements and an undesired release of the lid from the ring is substantially avoided.

[0020] Within one embodiment according to the present invention the lid resides within the ring opening such that in outward radial direction the lid is in the inner position and the ring is in the outer position and the foil inserted there between.

[0021] According to another embodiment the lid closes over the ring opening. Accordingly, in outward radial direction the ring part connected to the foil is at the inner position and the corresponding lid part in the outer position having the foil inserted in between.

[0022] Finally, the present invention relates to a method for producing a set comprising the steps of:

i) forming a preset by resiliently connecting the foil between the ring and the lid; and
ii) subjecting the preset to a heat treatment for adhering the foil to the ring.

[0023] Stated above the invention is based on the insight that a preset could be formed by inserting the foil in between the ring and the lid using a resilient connection. It is this preset that could be subsequently subjected to a heat treatment (preferably at a heat treatment temperature of in between 90-150° dependent on the sealing material used). Accordingly, no additional equipment or tools are required for maintaining the preset during the application of heat for a minimum amount of time for adhering the foil to the ring.

[0024] Obviously, when forming the preset, the foil may be first mounted on the ring or first mounted on the lid and subsequently apply the lid or the ring respectively and form the resilient connection.

[0025] In mounting the foil it might be that the foil remains on the ring or lid due to gravitation forces. If not applicable then the foil could be mounted using clamping force and/or magnetic force.

[0026] Mentioned and other features of the set, preset, container and its method of production will be further explained and illustrated by reference to several embodiments which are only given for illustrative purposes and are not intended to limit the present invention to any extent. In the description reference will be made to the figures wherein:

Figure 1 shows a container according to the invention;
Figures 2, 3 and 4 illustrate production steps for producing a set according to the invention;
Figure 5 shows at a larger scale detail V of figure 4;
Figure 6 shows at a larger scale detail VI of figure 5;
Figures 7, 8 and 9 show in cross-section other manufacturing steps for producing another set according to the invention; and
Figures 10, 11 and 12 show an alternative to the production steps shown in figures 7-9.

[0027] Figure 1 shows a container 1 according to the invention. The container comprises a body 2 and a ring 3 which is seamed to the body 2. A foil 4 is adhered to the ring and comprises a tab 5 for removing the foil 4 and making the content of the container 1 available via an opening determined by the ring 3. The container 1 further comprises a lid 6 which (if present) covers the foil and is connected to the ring 3.

[0028] Figures 2-4 illustrate a method for producing a set 7 comprising a ring 3, a foil 4 and a lid 6.

[0029] The ring 3 comprises a curl 8 for being connected to the container body 2 via a seam. The ring 3 further comprises a wall 9 connected via a horizontal wall 10 to a curved and downwardly directed ring part 11. This ring part 11 has resilient properties when urged into a radially outward direction.

[0030] The foil 4 is cup shaped having a central panel 12 and an upright edge 13.

[0031] The lid 6 has a central lid panel 14 and an upright wall 15.

[0032] As shown in figure 2 the metal foil 4 is mounted on the lid 6 and maintained on the lid 6 using a magnet 16.

[0033] Subsequently following the direction of the arrow 17 the lid 6 having mounted thereon the foil 4 is pressed into the ring 3 thereby forming a resilient connection in between the resilient ring part 11 and the slightly resilient wall 15 while the foil 4 with the upright edge 13 is interposed and clamped between. This preset 18 comprising the ring 3 and the lid 6 with resiliently connected in between the foil 4, is subsequently subjected to a heat treatment using heat 19. Thereby seaming the foil to the ring 3 for reasons that the upright edge 13 at its outer surface 20 and/or the inner surface 21 of the ring part 11 is provided with seam material. It is noted that the heat treatment may be carried out in an oven at a increased temperature such as 130°, or may be subjected to other heat treatments using other types of radiation.

[0034] Figure 5 shows more in detail the set 7 comprising the ring 3, the lid 6 and the foil 4 which is at a

resilient connection 22 in between the ring part 11 and the lid wall 15. As better illustrated in figure 6 it is shown that the foil 14 is adhered to the ring part 11 via the seem material 23. Clearly the compression force is in the direction of the arrow 24 whereas the direction of releasing the lid 6 from the ring 3 is in the direction of the arrow 25 and experiences only the friction force and not the resilient compression force.

[0035] Figures 7, 8 and 9 show another method according to the invention for producing a set according to the invention.

[0036] Figure 7 shows another ring 26 which has a resilient and bended ring part 27 which is in figure 7 in a slanted position. The foil 28 has an edge 29 which is in a similarly slanted position as the ring part 27. The lid 30 also comprises a lid wall 31 having a similarly slanted orientation. As shown in figure 8 the foil 28 is mounted on the lid 30 with the foil edge 29 and lid wall 31 closely fitting to one another. Subsequently following the arrows 32 the ring 26 is pressed onto the combination of lid 30 and foil 28. This results in a preset 33 shown in figure 9. Obviously the lid wall 31 and the ring part 27 are resilient thereby forming a resilient connection between the ring 26 and the lid 30 with the foil 28 pressed in between.

[0037] Application of heat 19 results in a seaming of the foil 28 to the ring part 27 by seam material applied to contact surfaces of the foil edge 29 and/or the ring part 27. Thereby forming the set 35 comprising the ring 26 with adhered thereto the foil 28 which is closed off by the lid 30 which is in a resilient connection with the ring 26.

[0038] The edge 29, the lid wall 31 and the ring part 27 have a corresponding slanted position which means that the angle alpha between a plane 36 through the contact area and a horizontal plane of the ring 26 is at about 60°.

[0039] Figures 10, 11 and 12 show the manufacturing steps of a preset 38 which after heat treatment results in a set 39 according to the invention.

[0040] The ring 40 comprises an upright part 41 for receiving a foil 42 which has a downwardly directed edge 43. The foil 42 is laid onto the ring 40. A preset 38 is formed by applying a lid 44 having a resilient and curved circumferential edge 45 on the ring. The lid 44 is applied following the direction of the arrow 46. The lid 44 is overclosing the foil 42 and the ring part 41. Formed is a resilient connection 47. In an oven heat 19 is applied thereby seaming the foil 42 via seaming material 48 to the ring 40.

[0041] It will be appreciated that the container and the ring according to the invention may be made of any suitable metal material, such as plated iron. The foil may be made of any suitable metal foil, preferably aluminum foil which is coated conventionally and if needed coated with seaming material for seaming the foil to the ring.

[0042] Similarly the lid may be preferably made of metal material but a plastic material is also possible whenever the plastic is indifferent to the heat application for forming the seam in between the foil and the ring. Relevant according to the invention is that the lid and the ring with the interposed foil form a resilient connection before and in particular during the application of heat for forming the seam connection between the foil and the ring.

[0043] It is noted that the ring part 11, 27 and 41 may have the illustrated form which will provide a contact surface with the foil and closure. However, the ring part may have the form of a curl. This form is more rigid and will have a substantially line contact with the foil and closure. Still a resilient connection and a practical airtight closure obtained.

[0044] Furthermore, the container may be made of any conventional diameter and form.

Claims

1. Set (7) for closing a container body (2), comprising a ring (3) determining an opening, a foil (4) adhered to the ring (3) and closing the opening, and a lid (6) covering the foil (4) and connected to the ring (3), wherein the ring (3) and the lid (6) are resiliently connected, **characterised in that** the foil (4) is adhered to the ring (3) in the resilient connection between the ring (3) and the lid (6).

2. Set according to claim 1, wherein the resilient connection has a contact area which is at an angle of 45-100°, preferably 45-90°, more preferably 75-90° with the horizontal plane defined by the ring (3).

3. Set according to claim 1 or 2, wherein the resilient connection is formed by a lid part (15) and a ring part (11) of which parts at least one part is resilient.

4. Set according to claim 3, wherein the lid part (15) and the ring part (11) are both resilient.

5. Set according to claim 3 or 4, wherein the resilient part is resiliently deformed to 0.2% of the yield point.

6. Set according to claim 1-5, wherein in the resilient connection the surface pressure is within the range of 600-1300N/cm^2, preferably 700-1200N/cm^2.

7. Set according to claim 1-6, wherein the lid (6) resides within the ring opening.

8. Set according to claim 1-6, wherein the lid closes over the ring opening.

9. Method for producing a set (7) according to any one of claims 1-8, comprising the steps of:

   i) forming a preset (18) by resiliently connecting the foil (4) between the ring (3) and the lid (6); and
   ii) subjecting the preset (18) a heat treatment for

adhering the foil (4) the ring (3).

10. Method according to claim 9, wherein the foil is mounted on the ring.

11. Method according to claim 9, wherein the foil is mounted on the lid.

12. Method according to claim 10 or 11, wherein the foil is mounted using clamping force and/or magnetic force.

13. Method according to claim 9-12, wherein the heat treatment is carried out in an oven.

14. Preset (18) for a set (7) according to any one of claims 1-8, formed by resiliently connecting the foil (4) between the ring (3) and the lid (6) according to step i) of claim 9.

15. Method for producing a container (1), comprising the steps of:

i) providing a container body (2) ; and
ii) seaming a set (7) comprising a ring (3), a foil (4) and a lid (6) according to any one of claims 1-8 via the ring (3) to the container body (2).

Patentansprüche

1. Satz (7) zum Schließen eines Behälterkörpers (2), umfassend einen Ring (3), der eine Öffnung festlegt, eine Folie (4), die an dem Ring (3) haftet und die Öffnung schließt, und einen Deckel (6), der die Folie (4) bedeckt und mit dem Ring (3) verbunden ist, wobei der Ring (3) und der Deckel (6) elastisch verbunden sind, **dadurch gekennzeichnet, dass** die Folie (4) am Ring (3) in der elastischen Verbindung zwischen dem Ring (3) und dem Deckel (6) haftet.

2. Satz gemäß Anspruch 1, wobei die elastische Verbindung eine Kontaktfläche aufweist, die in einem Winkel von 45-100°, bevorzugt 45-90°, noch bevorzugter 75-90° mit der horizontalen Ebene ist, die durch den Ring (3) festgelegt ist.

3. Satz gemäß Anspruch 1 oder 2, wobei die elastische Verbindung von einem Deckelteil (15) und einem Ringteil (11) gebildet ist, wobei von diesen Teilen wenigstens ein Teil elastisch ist.

4. Satz gemäß Anspruch 3, wobei das Deckelteil (15) und das Ringteil (11) beide elastisch sind.

5. Satz gemäß Anspruch 3 oder 4, wobei das elastische Teil auf 0.2% der Fließgrenze elastisch verformt ist.

6. Satz gemäß Anspruch 1-5, wobei in der elastischen Verbindung der Oberflächendruck innerhalb des Bereichs von 600-1300N/cm^2, bevorzugt 700-1200N/cm^2 ist.

7. Satz gemäß Anspruch 1-6, wobei der Deckel (6) in der Ringöffnung liegt.

8. Satz gemäß Anspruch 1-6, wobei der Deckel über der Ringöffnung schließt.

9. Verfahren zum Herstellen eines Satzes (7) gemäß einem der Ansprüche 1-8, welches die Schritte umfasst:

i) Bilden eines vormontierten Satzes (18) durch elastisches Verbinden der Folie (4) zwischen dem Ring (3) und dem Deckel (6); und
ii) Unterziehen des vormontierten Satzes (18) einer Wärmebehandlung zum Haften der Folie (4) an dem Ring (3).

10. Verfahren gemäß Anspruch 9, wobei die Folie auf dem Ring angebracht wird.

11. Verfahren gemäß Anspruch 9, wobei die Folie auf dem Deckel angebracht wird.

12. Verfahren gemäß Anspruch 10 oder 11, wobei die Folie unter Verwendung einer Klemmkraft und/oder Magnetkraft angebracht wird.

13. Verfahren gemäß Anspruch 9-12, wobei die Wärmebehandlung in einem Ofen ausgeführt wird.

14. Vormontierter Satz (18) für einen Satz (7) gemäß einem der Ansprüche 1-8, der gebildet ist durch elastisches Verbinden der Folie (4) zwischen dem Ring (3) und dem Deckel (6) gemäß Schritt i) von Anspruch 9.

15. Verfahren zum Herstellen eines Behälters (1), umfassend die Schritte:

i) Bereitstellen eine Behälterkörpers (2); und
ii) Verbinden durch eine Schweißnaht eines Satzes (7), der einen Ring (3), eine Folie (4) und einen Deckel (6) gemäß einem der Ansprüche 1-8 umfasst, über den Ring (3) mit dem Behälterkörper (2).

Revendications

1. Ensemble (7) pour fermer un corps de récipient (2) comprenant une bague (3) déterminant une ouverture, une feuille (4) fixée sur la bague (3) et fermant l'ouverture, et un couvercle (6) recouvrant la feuille

(4) et raccordé à la bague (3), dans lequel la bague (3) et le couvercle (6) sont raccordés de manière élastique, **caractérisé en ce que** la feuille (4) est fixée sur la bague (3) dans le raccordement élastique entre la bague (3) et le couvercle (6).

2. Ensemble selon la revendication 1, dans lequel le raccordement élastique a une surface de contact qui est à un angle de 45-100°, de préférence 45-90°, encore de préférence 75-90° avec le plan horizontal défini par la bague (3).

3. Ensemble selon la revendication 1 ou 2, dans lequel le raccordement élastique est formé par une partie de couvercle (15) et une partie de bague (11) dont au moins une partie est élastique.

4. Ensemble selon la revendication 3, dans lequel la partie de couvercle (15) et la partie de bague (11) sont toutes deux élastiques.

5. Ensemble selon la revendication 3 ou 4, dans lequel la partie élastique est élastiquement déformée à 0,2 % de son point d'élasticité.

6. Ensemble selon les revendications 1 à 5, dans lequel dans le raccordement élastique, la pression de surface est de l'ordre de 600-1 300 N/cm^2, de préférence 700-1 200 N/cm^2.

7. Ensemble selon les revendications 1 à 6, dans lequel le couvercle (6) se trouve à l'intérieur de l'ouverture de bague.

8. Ensemble selon les revendications 1 à 6, dans lequel le couvercle se ferme sur l'ouverture de bague.

9. Procédé pour produire un ensemble (7) selon l'une quelconque des revendications 1 à 8, comprenant les étapes suivantes:

i) former un ensemble préalable (18) en raccordant élastiquement la feuille (4) entre la bague (3) et le couvercle (6) ; et
ii) soumettre l'ensemble préalable (18) à un traitement thermique pour fixer la feuille (4) sur la bague (3).

10. Procédé selon la revendication 9, dans lequel la feuille est montée sur la bague.

11. Procédé selon la revendication 9, dans lequel la feuille est montée sur le couvercle.

12. Procédé selon la revendication 10 ou 11, dans lequel la feuille est montée en utilisant la force de serrage et/ou la force magnétique.

13. Procédé selon les revendications 9 à 12, dans lequel le traitement thermique est réalisé dans un four.

14. Ensemble préalable (18) pour un ensemble (7) selon l'une quelconque des revendications 1 à 8, formé en raccordant élastiquement la feuille (4) entre la bague (3) et le couvercle (6) selon l'étape i) de la revendication 9.

15. Procédé pour produire un récipient (1), comprenant les étapes suivantes :

i) prévoir un corps de récipient (2) ; et
ii) sceller un ensemble (7) comprenant une bague (3), une feuille (4) et un couvercle (6) selon l'une quelconque des revendications 1 à 8 par l'intermédiaire de la bague (3) sur le corps de récipient (2).

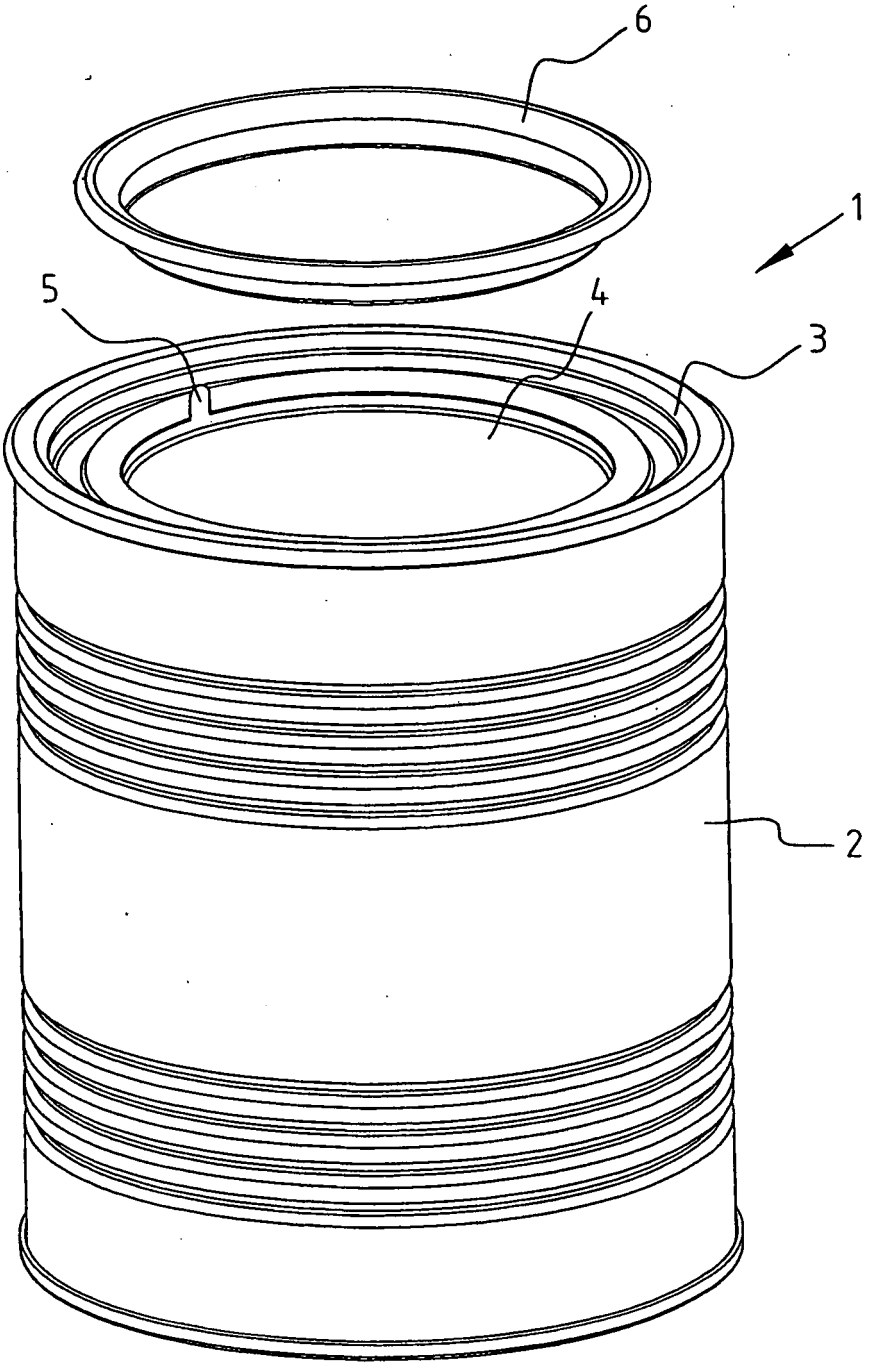


FIG. 1

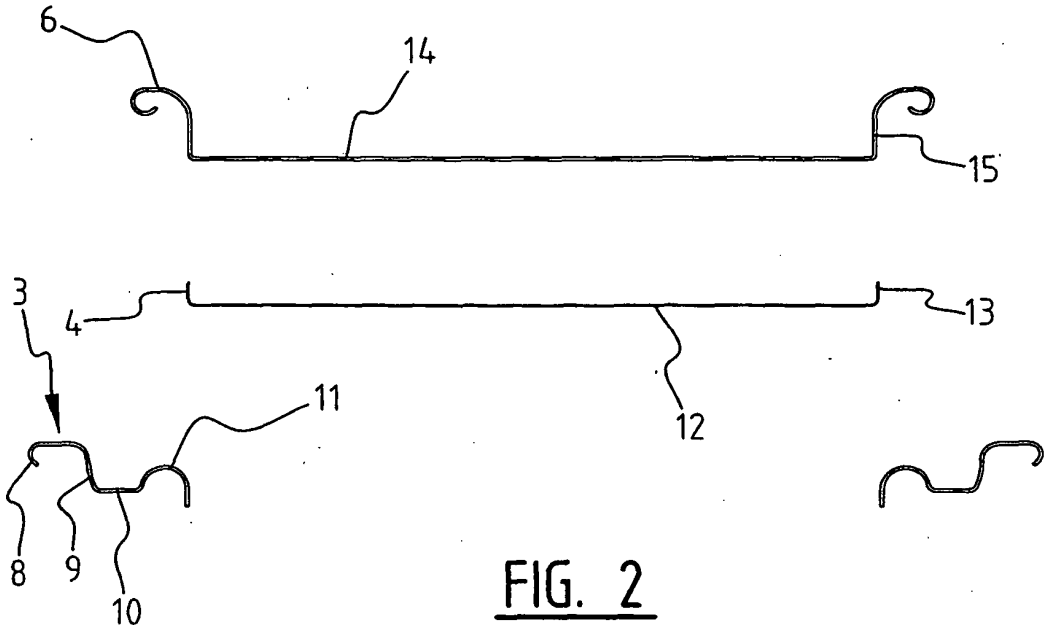


FIG. 2

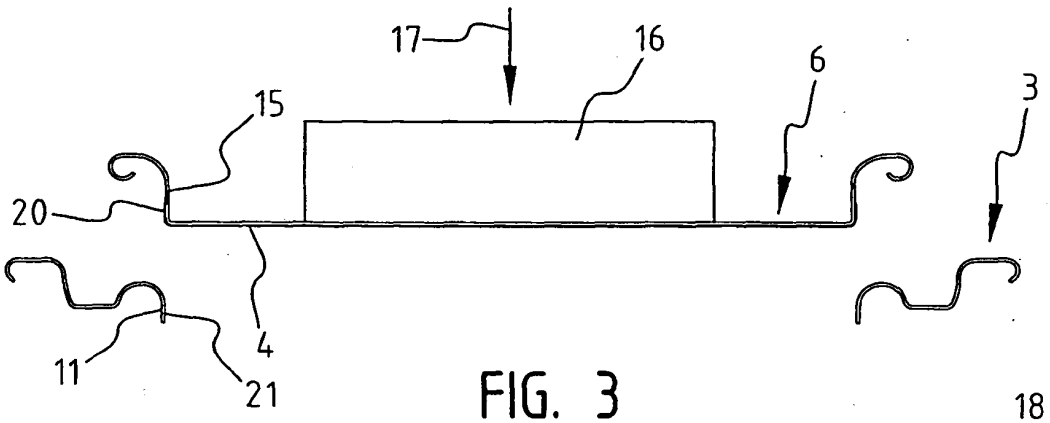


FIG. 3

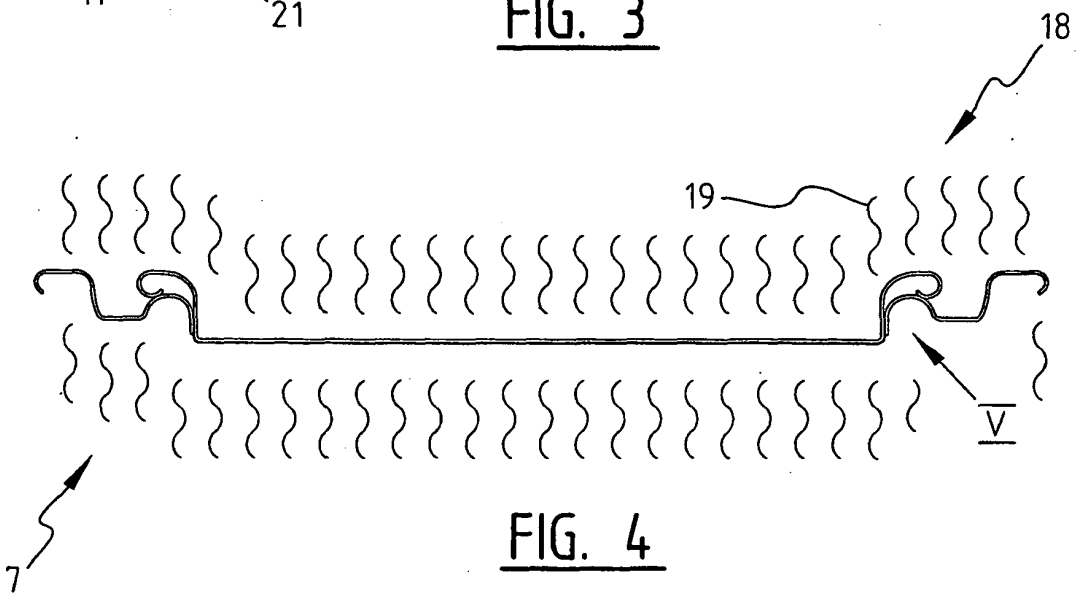


FIG. 4

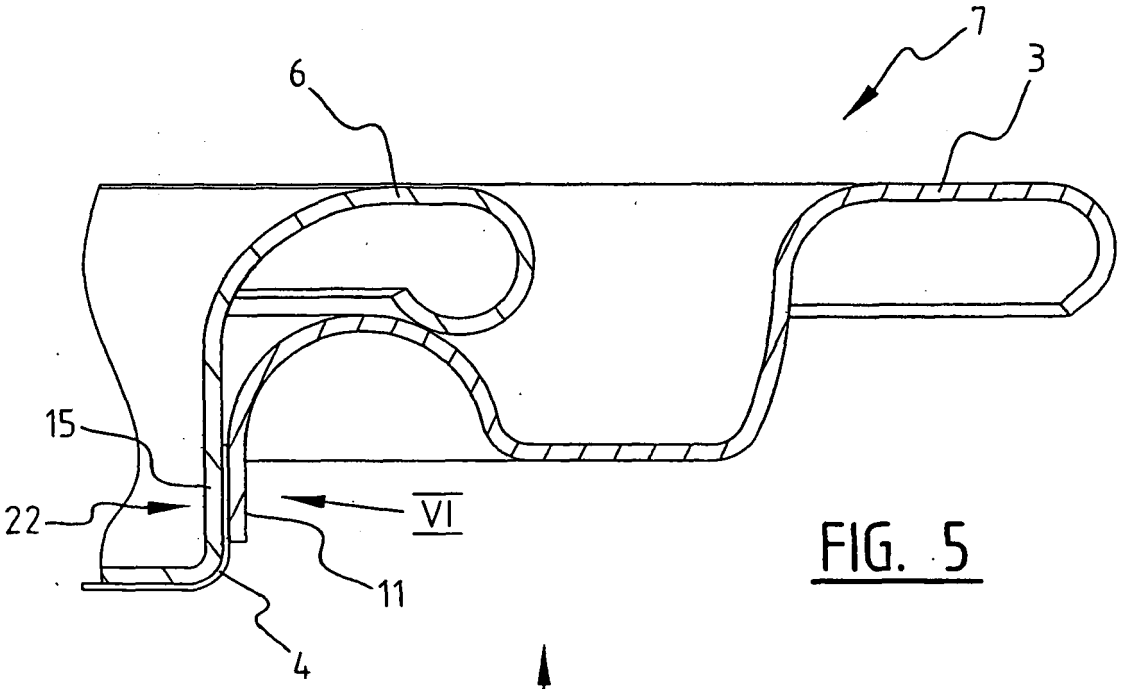


FIG. 5

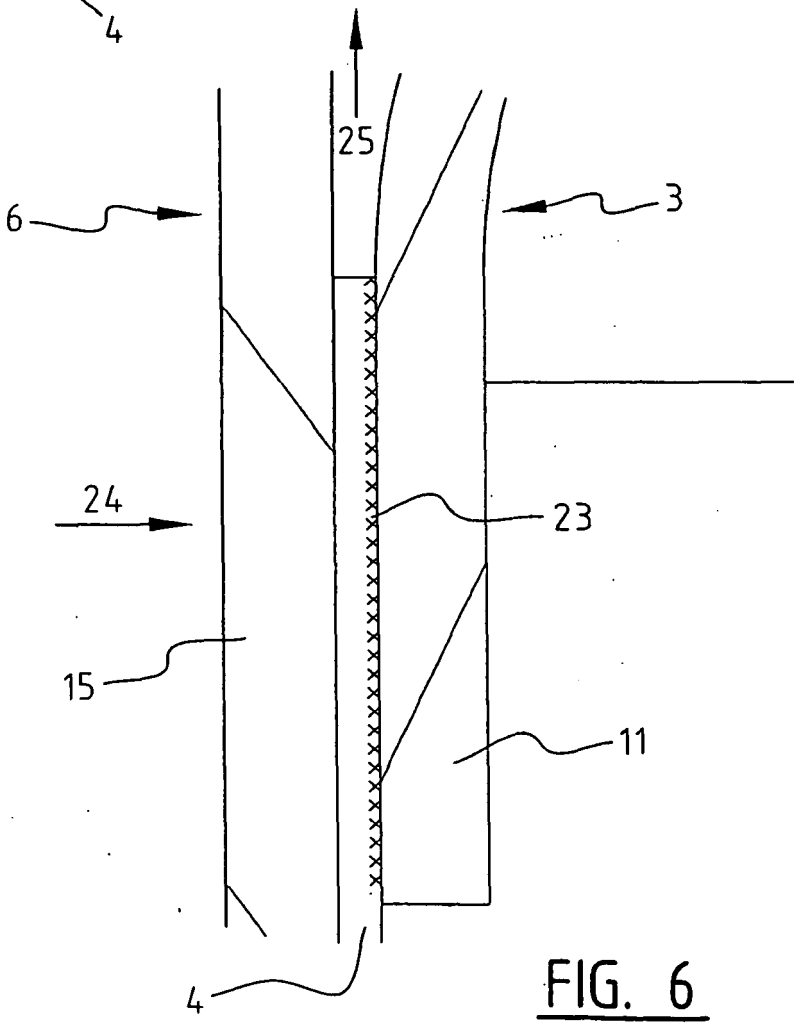


FIG. 6

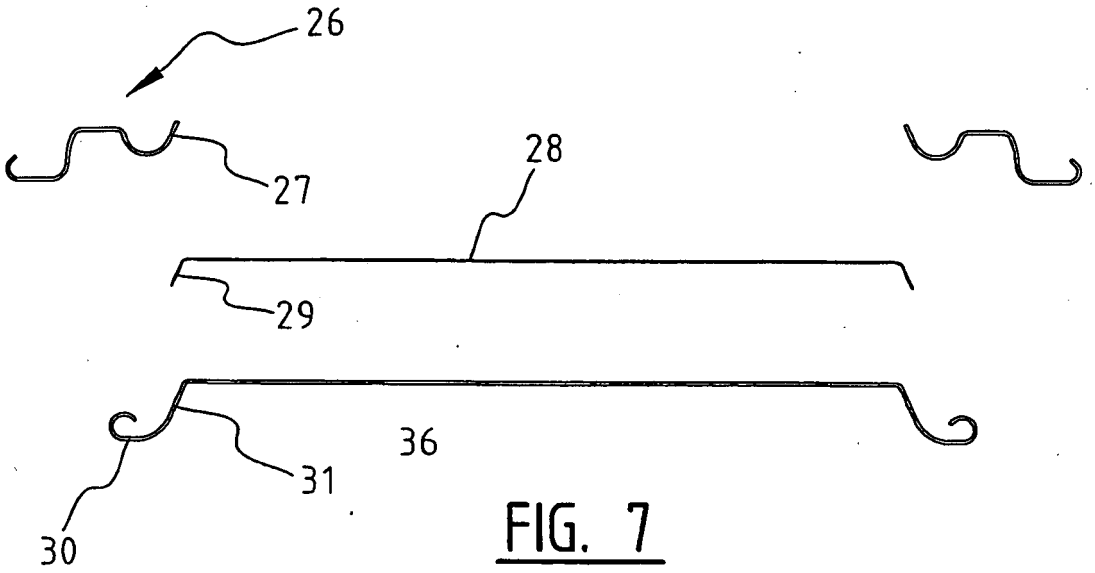


FIG. 7

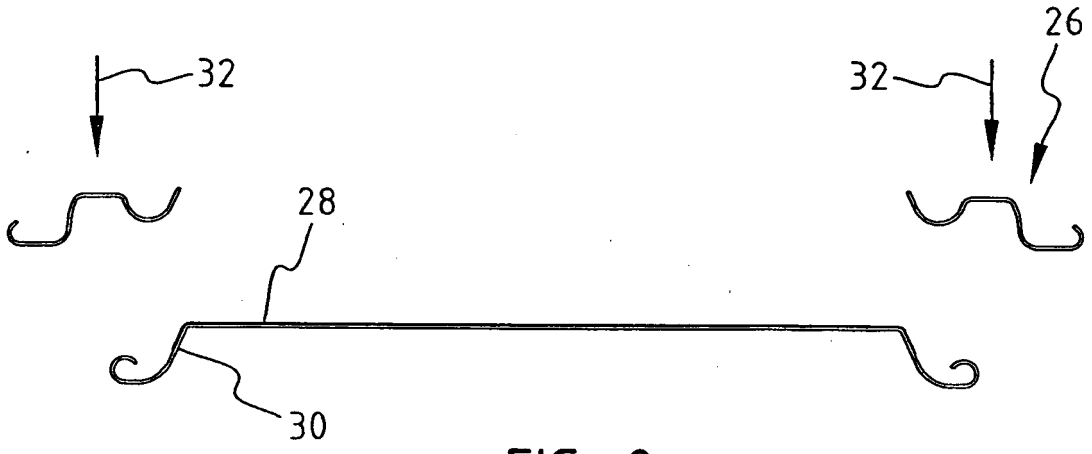


FIG. 8

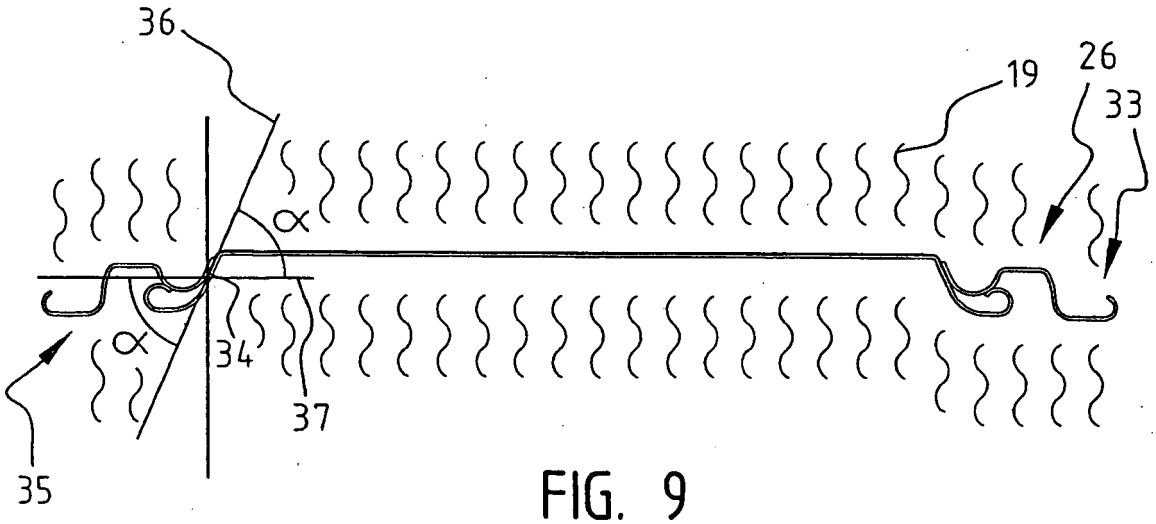


FIG. 9

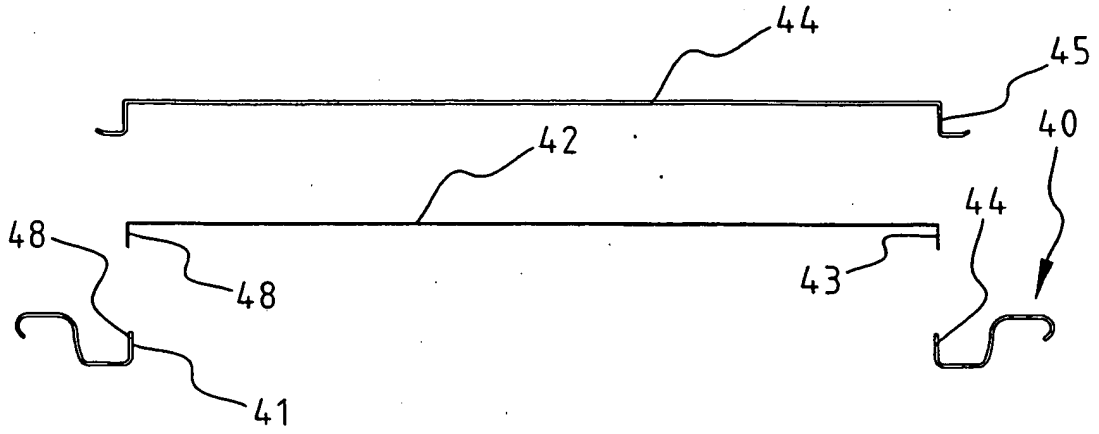


FIG. 10

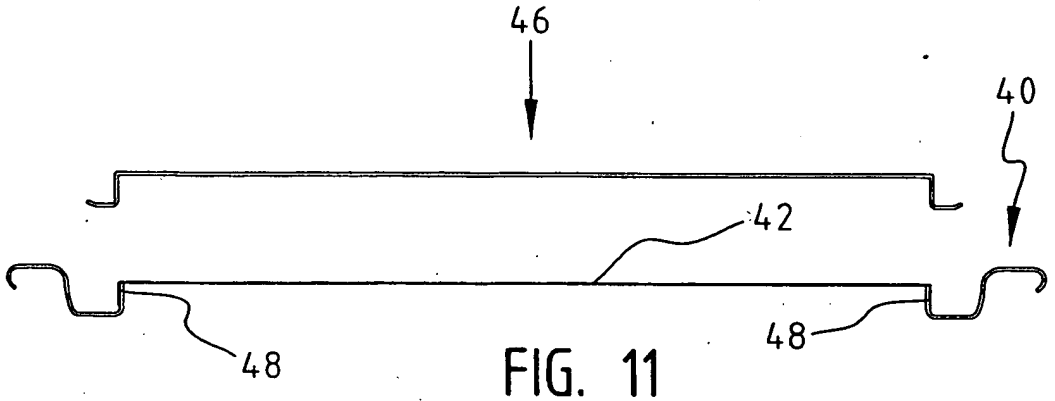


FIG. 11

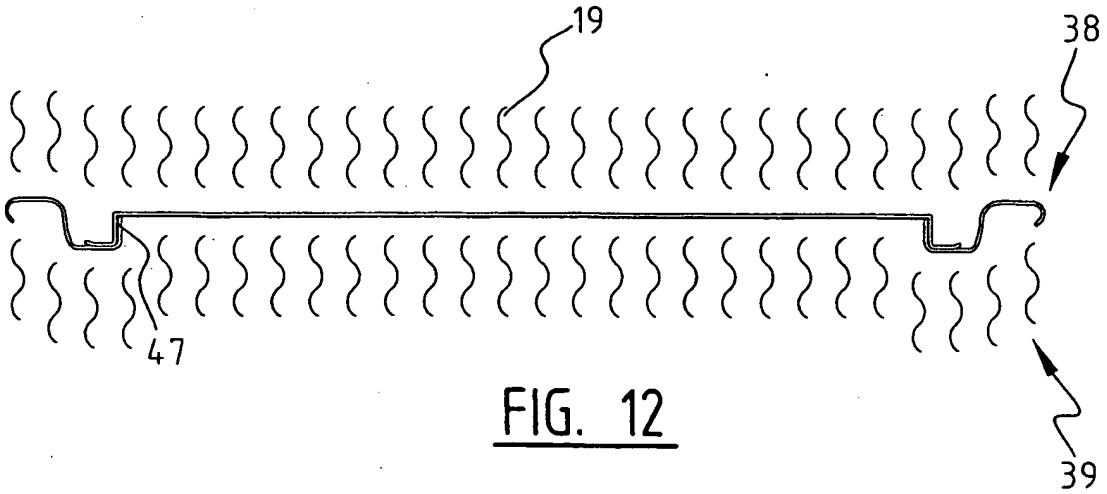


FIG. 12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 07562 A **[0010]**
- FR 789556 A **[0011]**
- WO 9725255 A **[0012]**