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(57) The present invention relates to a zipper seal (1) providing a barrier against the passage of bugs or particles therethrough, in which the proposed seal is arranged at the end of a zipper (40), covering the maximum closed position of said zipper by means of a flexible front sealing element (10) formed by a housing wall (11) defining a hollow housing (12), the shape of which is complementary to the shape of the slider (41) of the zipper,

such that when the zipper is closed by taking said slider to the maximum closed position, the slider is at least partially inserted tightly into the hollow housing, preventing the passage of bugs or particles. The invention also proposes a flexible rear sealing element (20) located on the back in the maximum closed position of the zipper which also blocks said position from the rear face.

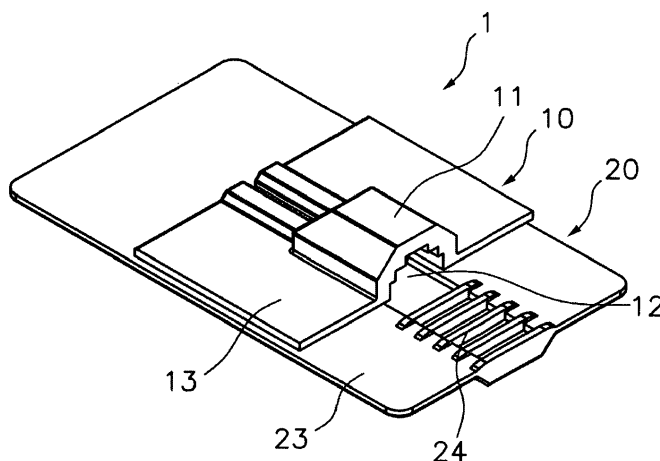


Fig. 1

Description

Field of the Art

[0001] The present invention relates to a zipper seal providing a barrier against the passage of bugs or particles therethrough which can be installed in a maximum closed position of a zipper, particularly a zipper arranged in a fabric mattress cover, such that a slider of the zipper arranged in said maximum closed position is tightly fitted to a portion of said seal.

State of the Art

[0002] A number of documents are known to describe solutions for preventing the passage of particles and bugs through a closed zipper, particularly for preventing the passage of parasitic bugs into or out of a mattress, such as patent document US2012084918, for example, which describes a fabric cover provided for covering the portion of the zipper coinciding with the maximum closed position, both on the front and back in said maximum closed position.

[0003] Patent document EP1969971 also describes a solution to this problem consisting of a foam sheet stitched on the back in the maximum closed position of the zipper, such that said foam material is pressed against the zipper preventing bugs that hypothetically go through said maximum closed position from being able to find their way between the back of the zipper and said foamed material.

[0004] Patent document WO2012173970 also describes a seal providing a barrier against the passage of particles and bugs through a zipper in which several solutions are proposed, all of which are provided for being fixed to only one of the faces of the zipper by means of glue or heat. The solution described in Figure 8 consists of a rigid casing in which the slider is partially fitted, preventing the passage of particles and bugs between said slider and said casing.

[0005] This solution does not have a flexible fitting that allows assuring tight coupling. Furthermore, since the zipper and laminar support in which said zipper is fixed are flexible, and the seal does not have a portion holding the slider from the rear face of the zipper, it is likely that bending the zipper will separate the slider from said casing, opening up a passage for bugs or particles to enter between the slider and the casing.

Brief Description of the Invention

[0006] The proposed invention relates to a zipper seal providing a barrier against the passage of bugs or particles therethrough configured to be adapted to a zipper provided for closing a linear opening of a flexible sheet material provided with a front face and a rear face. Said flexible sheet material will preferably be a piece of natural or synthetic cloth or fabric. The sheet material can be a

laminated material, for example, obtained by means of attaching several sheets of material.

[0007] Said zipper will be provided with two ends and a slider coupled to said zipper for opening and closing same by means of sliding the slider from one end, where a maximum open position of the zipper is defined, to the other end of the zipper, where a maximum closed position of the zipper is defined.

[0008] It will be understood that the zipper is formed by two opposing and facing toothed lips, each being attached to one side of the mentioned linear opening of the sheet material, the teeth of a lip being able to engage the teeth of the other toothed lip, closing the linear opening.

[0009] The slider is the element which is attached in a sliding manner on both toothed lips of the zipper and engages or disengages the toothed lips of the zipper by means of sliding.

[0010] The proposed zipper seal includes a front sealing element arranged coinciding with the maximum closed position of the zipper on the front face of the flexible sheet material.

[0011] Said front sealing element has a housing wall providing a sealed attachment with the sheet material around the maximum closed position except in the direction in which the zipper extends, and defining a hollow housing around said maximum closed position communicating with the outside through an opening of the housing wall provided in the direction in which the zipper extends, both the opening and the housing being complementary to the shape of the slider.

[0012] In other words, said housing wall surrounds the maximum closed position on all sides except in the direction in which the zipper extends, ending in said maximum closed position.

[0013] The housing wall defines a cavity or hollow housing open to the outside through the opening arranged in the direction in which the zipper extends, through which the slider can at least be partially introduced into said hollow housing.

[0014] To prevent the entrance of bugs or particles, the opening and the hollow housing are envisaged to have a shape complementary to the shape of the slider.

[0015] The proposed invention includes, in a novel manner, the following:

- said housing wall is made of a flexible material allowing, when said slider is inside said housing in the maximum closed position, said housing wall to be tightly coupled by elastic deformation to the outer surface of said slider, preventing the passage of bugs or particles between the mentioned housing wall and said outer surface of the slider, and providing mechanical resistance against opening the zipper;
- said housing wall has a flexible perimetral front flap extending around same, except in the direction in which the zipper extends, the mentioned front flap being approximately parallel to the sheet material;

and in that

- said zipper seal further includes a rear sealing element formed by a rear element made of a flexible material arranged coinciding with the maximum closed position of the zipper on the rear face of the flexible sheet material, and coinciding with the position of the housing, providing a tight attachment with said rear face in the maximum closed position, said rear element made of a flexible material being provided with a flexible rear flap extending around same in all directions or in all directions except the direction in which the zipper extends, the mentioned rear flap being approximately parallel to the sheet material.

[0016] The housing wall therefore surrounds the maximum closed position, the attachment thereof with the flexible sheet material being firmly sealed and covered by means of the mentioned front flap, except in the direction in which the zipper extends, thereby allowing the slider to enter and exit said hollow housing following the zipper. Said housing wall will be elastically adapted around the slider, which acts like a plug of the opening of the hollow housing when it is in the maximum closed position.

[0017] The seal further includes a rear sealing element applied on the rear face of the sheet material in a position coinciding with the maximum closed position and the hollow housing. Said rear sealing element also includes a flexible rear flap extending such that it surrounds said maximum closed position, the attachment with the sheet material being firmly sealed.

[0018] According to another complementary embodiment, the rear sealing element is provided for pressing the slider against the front sealing element when said slider is in the maximum closed position.

[0019] Alternatively, the front sealing element can tightly house a slider including an articulated pull so that in the maximum closed position, said pull is partially housed inside the housing, together with at least one part of the slider and retained in a position parallel to the direction in which the zipper extends. The part of the pull not inserted in the housing allows an operator to pull on said part to extract the slider from the hollow housing.

[0020] According to another embodiment, the front sealing element and the rear sealing element are attached by an attachment element, both elements being attached through the flexible element. Said attachment element is optionally located in a position adjacent to the hollow housing and opposite the position of the opening of the housing wall.

[0021] The front sealing element, rear sealing element and attachment element are preferably made of one and the same material and are integral with one another, the three elements being integrated in a single part.

[0022] The seal proposed in the present invention can be made of a polymer, resin or plastic material.

[0023] To assure tight attachment of the housing wall to the rear element made of a flexible material, preventing

the entrance of bugs or particles, the invention proposes stitching the front and rear flaps of the front seal and rear seal arranged on opposite faces of the sheet element together, said sheet element being trapped between both flaps. Stitching simultaneously attaches the three layers (the front and rear flaps and the flexible element) to one another, assuring a firm attachment. The stitching will surround the maximum closed position except in the direction in which the zipper extends.

[0024] According to an additional embodiment, the rear sealing element made of a flexible material has a relief complementary to the shape of the closed zipper, allowing tight coupling of said rear element with said closed zipper on the rear face of the sheet material. This feature produces an even tighter coupling between the rear seal and the rear face of the closed zipper, hindering the passage of a particles or bug that had been able to enter the hollow housing and gone through the zipper, since from said point the only possible path is in the direction in which the zipper extends, since the flaps which are attached to the sheet material extend in the other directions.

[0025] The proposed seal will preferably be made of a material that is resistant to the thermal and chemical treatments characteristic of a washing and drying cycle in industrial and non-industrial washing machines.

Brief Description of the Drawings

[0026] The foregoing and other advantages and features will be better understood based on the following detailed description of an embodiment in reference to the attached drawings which must be interpreted in an illustrative and non-limiting manner, in which:

Figure 1 is an axonometric view of a zipper seal seen from the front face thereof;

Figure 2 is a view of the same seal shown in Figure 1, being attached to a sheet material provided with a zipper, and the slider of said zipper being arranged in the maximum closed position and partially inserted into the hollow housing;

Figure 3 is a plan view from the front face of the seal shown in Figure 1;

Figure 4 is a side view of the seal shown in Figure 1; Figure 5 is a cross-section view along the axis of symmetry of the seal shown in Figure 1;

Figure 6 is a front elevational view of the seal shown in Figure 1 seen from the side on which the zipper extends;

Figure 7 is a front elevational view from the side opposite that shown in Figure 6.

Figure 8 is a view like that shown in Figure 1, but of an alternative embodiment in which the attachment element includes a wall transverse to the direction in which the zipper extends;

Figure 9 is a view equivalent to that shown in Figure 2, but in reference to the embodiment shown in Fig-

ure 8.

Detailed Description of an Embodiment

[0027] According to a non-limiting embodiment shown in Figure 1, the present invention relates to a seal 1 for a zipper 40 providing a barrier against the passage of bugs or particles.

[0028] Such seals are particularly indicated in zippers 40 of covers placed, for example, on cushions, pillows or mattresses, places where an entrance point could allow, for example, a colony of bedbugs or another parasite to settle inside said mattress, cushion or pillow.

[0029] The zipper 40 is attached to an elongated opening of a sheet material 50, such as a fabric forming a cover, for example. The zipper 40 allows opening and closing said linear opening of said sheet material 50 by means of a slider 41 running along the mentioned zipper 40 between an end defining a maximum open position and the opposite end of the zipper 40 defining the maximum closed position of the zipper 40.

[0030] The proposed seal 1 is fixed to the end of the zipper 40 covering the maximum closed position, such that by positioning the slider 41 in the maximum closed position, the combination of the slider 41 with the seal 1 completely blocks any possible entrance through the maximum closed position that may allow the passage of bugs or particles therethrough.

[0031] Said seal 1 consists of a front sealing element 10 arranged on the front face of the sheet material 50 (from where the slider 41 can be accessed) and a rear sealing element 20 arranged on the rear face of the sheet material 50, both sealing elements 10 and 20 coinciding with the maximum closed position of the zipper.

[0032] The front sealing element includes a housing wall 11 surrounding a hollow housing 12 superimposed on the maximum closed position and attached to the sheet material 50 around said maximum closed position, except in the direction in which the zipper 40 extends, completely sealing the maximum closed position except in said direction of the zipper 40, where an opening communicates the hollow housing 12 with the outside.

[0033] The housing wall 11 therefore creates a shell forming the hollow housing 12 around the maximum closed position, attached along almost its entire perimeter to the sheet material 50, leaving only one opening in the direction in which the zipper 40 extends, where the slider 41 can be at least partially introduced in said hollow housing 12 upon reaching the maximum closed position.

[0034] The shape and size of the hollow housing 12 and its opening are provided for being complementary to the shape and size of the slider 41, such that there is a tight coupling. The material used to make said seal 1 will be flexible, thereby achieving zero clearance between the slider 41 and the housing wall 11 after said coupling, and also achieving the slider 41 being retained by the elastic pressure of said housing wall 11, preventing accidental opening of the zipper 40.

[0035] On the other hand, the rear sealing element 20 is coupled to the rear face in the maximum closed position of the zipper 40, hindering the passage of particles or bugs that went through the front sealing element 10. The sealing element 20 further includes a relief 24 coinciding with the relief of the rear face of the closed zipper 40. Said relief 24 entails a series of traps acting as a barrier against the passage of particles and bugs.

[0036] The front seal 10 extends with front flaps 13 parallel to the sheet material 50 around the maximum closed position, like the rear seal 20, which also extends by means of rear flaps 23 surrounding the maximum closed position, the sheet material 50 being trapped between said front and rear flaps 13 and 23 by the two faces thereof. To assure firm sealing, the invention proposes simultaneously stitching both flaps 13 and 23 together with the sheet material 50.

[0037] In the proposed seal 1 shown in the attached drawings, the front sealing element 10 and rear sealing element 20 are attached by means of an attachment element 30 going through the sheet material 50, which allows correctly maintaining the relative position of the front seal 10 and rear seal 20 and makes positioning thereof on the maximum closed position easier.

[0038] In the embodiment shown in Figures 1 to 7, this attachment element 30 consists of a wall arranged aligned with the direction in which the zipper extends and after same, after the maximum closed position. In another embodiment shown in Figures 8 and 9, the attachment element 30 is at least one wall perpendicular to the direction in which the zipper 40 extends, located adjacent to the end of the zipper 40, close to the maximum closed position.

Claims

1. A zipper seal providing a barrier against the passage of bugs or particles therethrough configured for being adapted to a zipper (40) provided for closing a linear opening of a flexible sheet material (50) provided with a front face and a rear face, said zipper (40) being provided with two ends and a slider (41) coupled to said zipper (40) for opening and closing same by means of sliding the slider (41) from one end, where a maximum open position of the zipper is defined, to the other end of the zipper (40), where a maximum closed position of the zipper is defined; said zipper seal (1) including:

- a front sealing element (10) arranged coinciding with the maximum closed position of the zipper on the front face of the flexible sheet material (50);

said front sealing element (10) having a housing wall (11) providing a sealed attachment with the sheet material (50) around the maximum closed position

except in the direction in which the zipper extends, and defining a hollow housing (12) around said maximum closed position communicating with the outside through an opening of the housing wall (11) provided in the direction in which the zipper (40) extends, both the opening and the hollow housing (12) being complementary to the shape of the slider; **characterized in that**

- said housing wall (11) is made of a flexible material such that when said slider (41) is inside said hollow housing (12) in the maximum closed position, said housing wall (11) is tightly coupled by elastic deformation to the outer surface of said slider (41), preventing the passage of bugs or particles between the mentioned housing wall (11) and said outer surface of the slider (41), and said elastic deformation provides mechanical resistance against opening the zipper (40);
- said housing wall (11) has a flexible perimetral front flap (13) extending around same except in the direction in which the zipper extends, the mentioned perimetral front flap (13) being approximately parallel to the sheet material (50); and **in that**
- said zipper seal (1) further includes a rear sealing element (20) made of a flexible material arranged coinciding with the maximum closed position of the zipper (40) on the rear face of the sheet material (50), and coinciding with the position of the hollow housing (12), providing a tight attachment with the rear face in the maximum closed position, said rear sealing element (20) being provided with a flexible rear flap (23) extending around same in all directions, the mentioned rear flap (23) being approximately parallel to the sheet material (50).

2. The seal according to claim 1, **characterized in that** the rear sealing element (20) is provided for pressing a slider (41) arranged in the maximum closed position against the front sealing element (10).
3. The seal according to claim 1 or 2, **characterized in that** the front sealing element (10) is provided for tightly housing a slider (41) including an articulated pull (42) so that in the maximum closed position, said articulated pull (42) is partially housed inside the hollow housing (12) and retained in a position parallel to the direction in which the zipper (40) extends.
4. The seal according to claim 1, 2 or 3, **characterized in that** the front sealing element (10) and the rear sealing element (20) are attached by an attachment element (30).
5. The seal according to claim 4, **characterized in that** said attachment element (30) is located in a position

adjacent to the hollow housing (12) and opposite the position of the opening of the housing wall (11).

6. The seal according to claim 4 or 5, **characterized in that** the front sealing element (10), rear sealing element (20) and attachment element (30) are made of one and the same material and are integral with one another.
7. The seal according to claim 4, 5 or 6, **characterized in that** the seal (1) is made entirely of a polymer, resin or plastic material.
8. The seal according to any one of the preceding claims, **characterized in that** the mentioned tight attachment of the front sealing element (10) and rear sealing element (20) is obtained by means of heat-sealing or by means of simultaneously stitching said front and rear flaps (13, 23) arranged on opposite faces together with the flexible sheet element (50) interposed between them.
9. The seal according to claim 8, **characterized in that** the stitching or heat-sealing surrounds the maximum closed position except in the direction in which the zipper (40) extends.
10. The seal according to any one of the preceding claims, **characterized in that** the rear sealing element (20) has a relief (24) complementary to the shape of the closed zipper (40), allowing tight coupling of said rear sealing element (20) with said closed zipper (40), said relief (24) providing a series of traps acting as a barrier against the passage of particles and bugs.
11. The seal according to any one of the preceding claims, **characterized in that** it is made of a material that is resistant to the thermal and chemical treatments characteristic of washing and drying fabrics in washing machines and dryers.

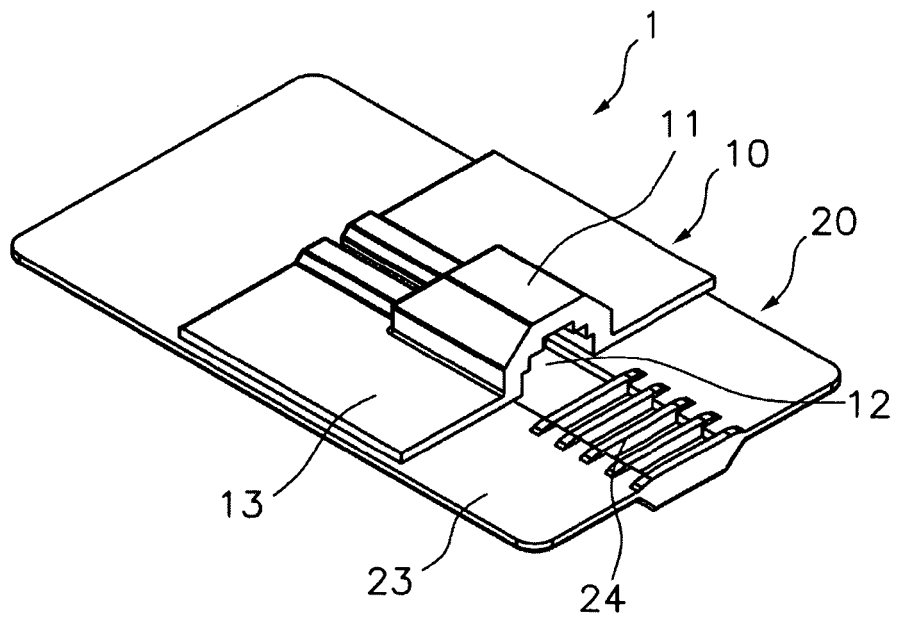


Fig. 1

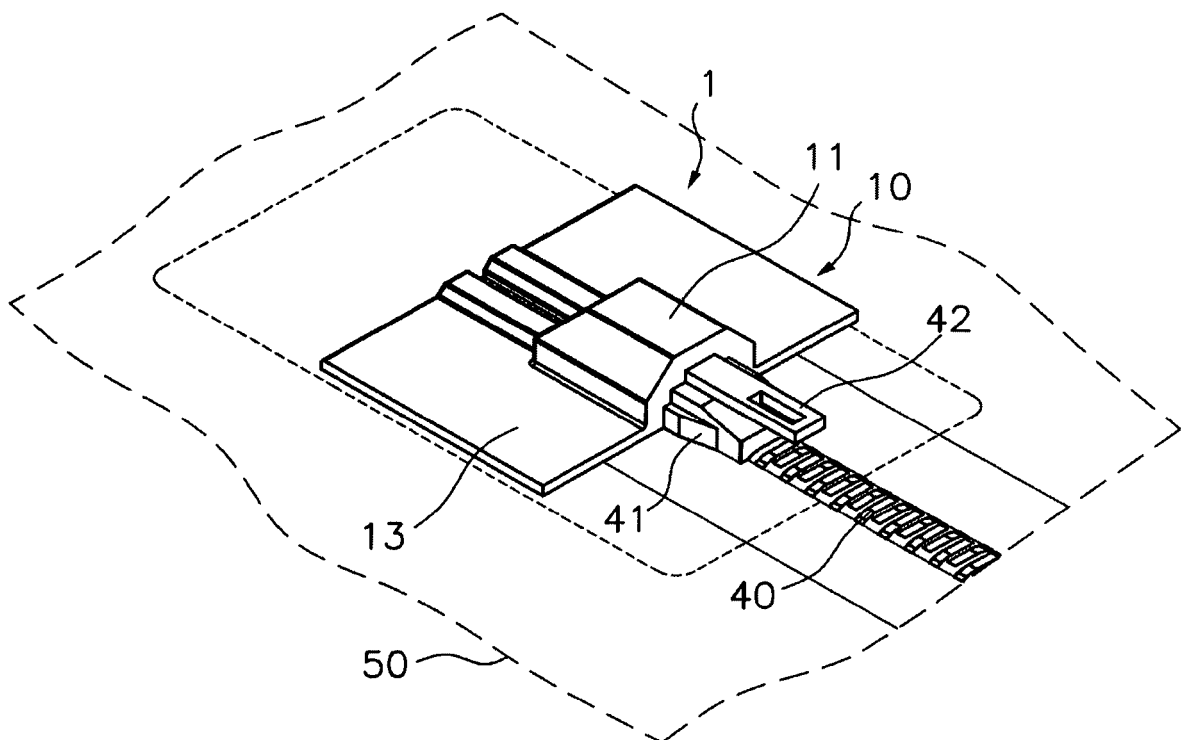


Fig. 2

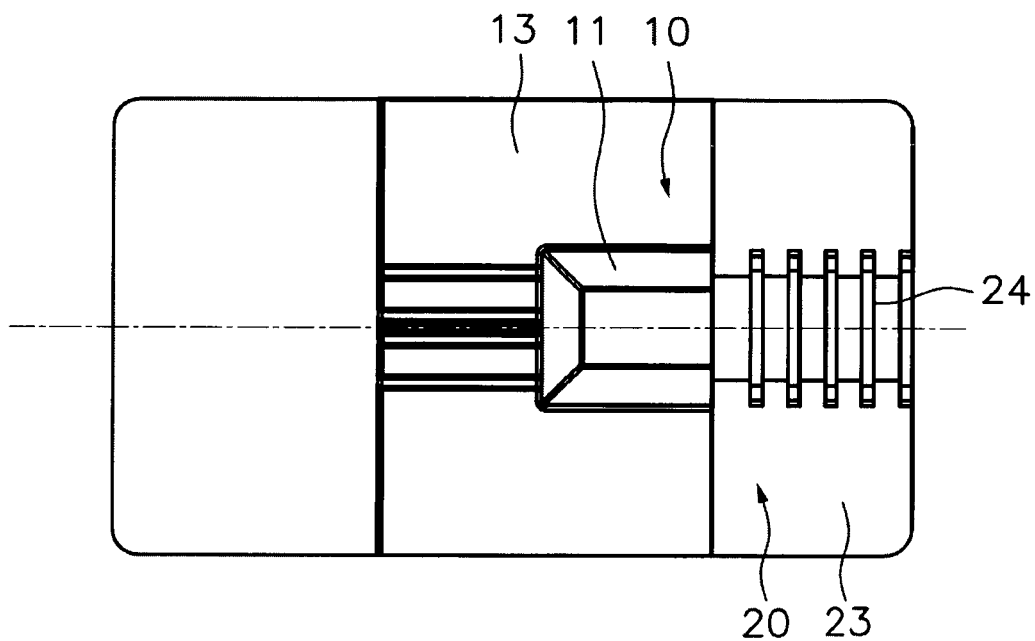


Fig. 3

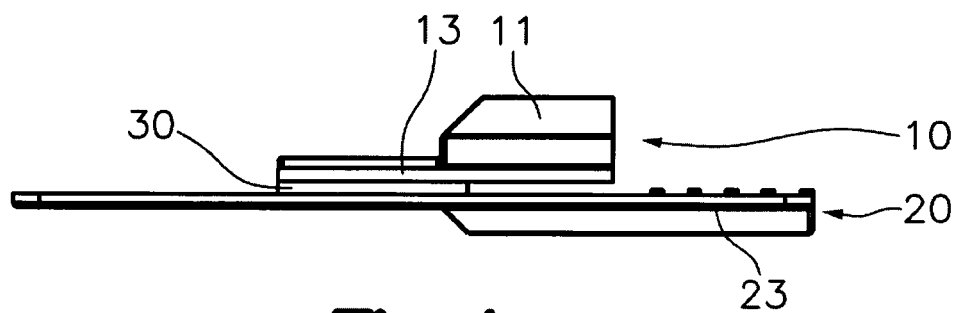


Fig. 4

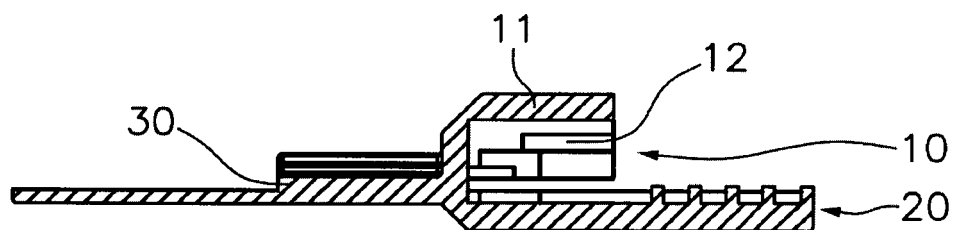


Fig. 5

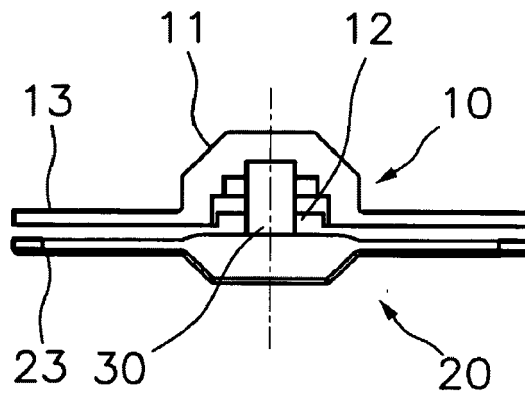


Fig. 6

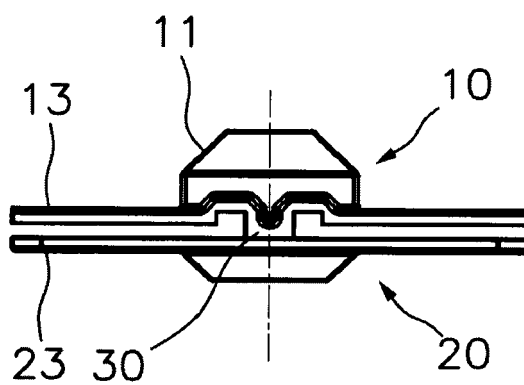


Fig. 7

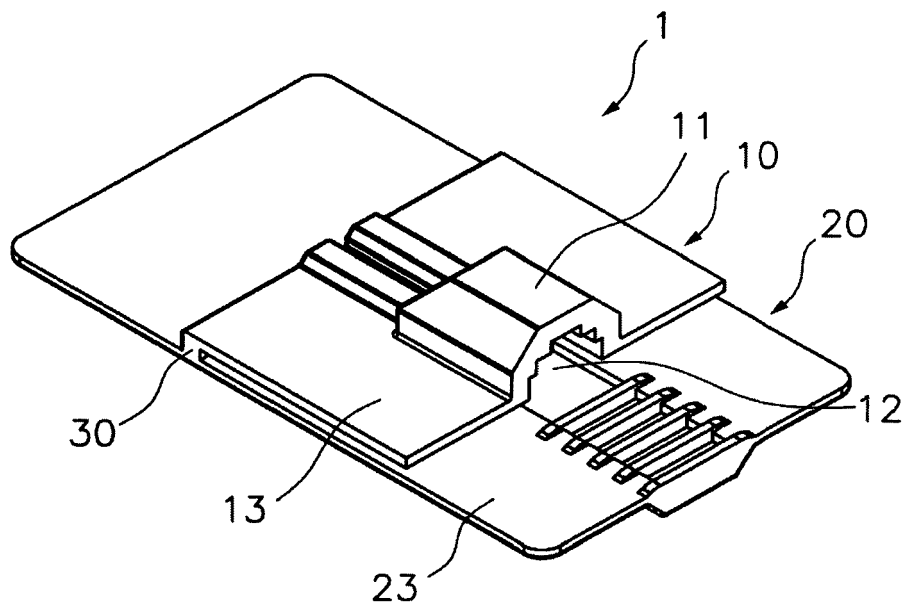


Fig. 8

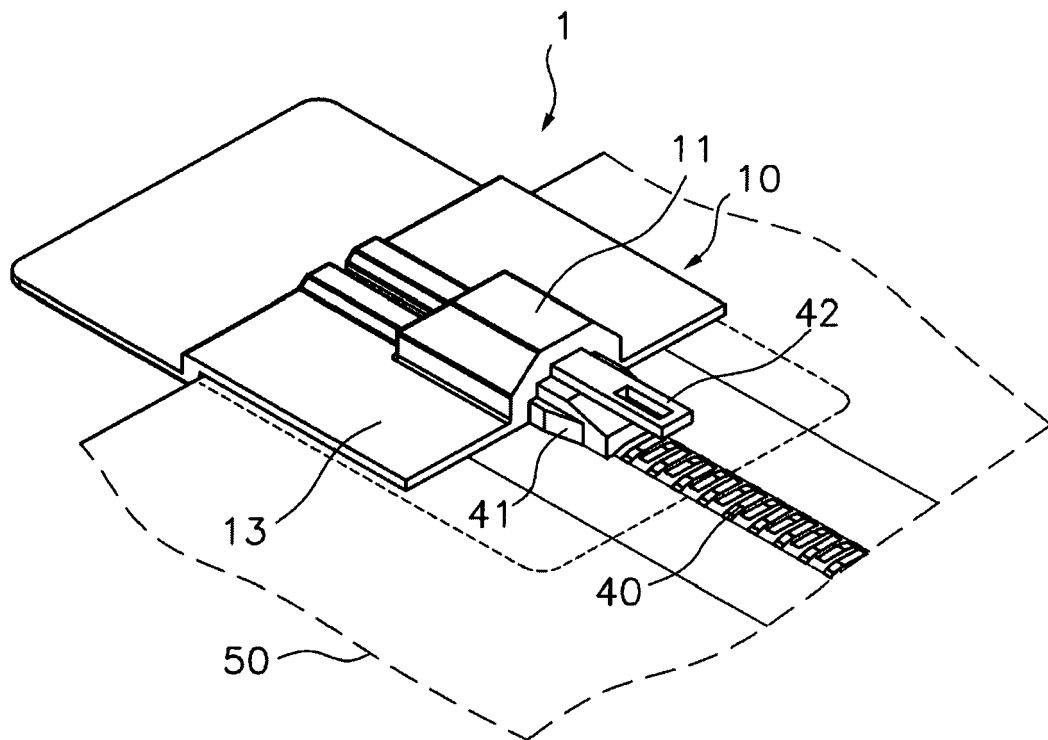


Fig. 9



EUROPEAN SEARCH REPORT

Application Number
EP 15 38 0006

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2005/040559 A1 (YANG SHIH SHENG [TW]) 24 February 2005 (2005-02-24) * paragraph [0021] - paragraph [0028]; figures 1-6 *	1-11	INV. A47C31/00 A47C31/10
A	US 2012/311785 A1 (GOLDBERG GARY [US]) 13 December 2012 (2012-12-13) * paragraph [0045] - paragraph [0105]; figures 1-18b *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 August 2015	Examiner Lehe, Jörn
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 38 0006

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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27-08-2015

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REFERENCES CITED IN THE DESCRIPTION

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- EP 1969971 A [0003]
- WO 2012173970 A [0004]