Canadian Intellectual Property Office

CA 2918960 C 2018/10/30

(11)(21) 2 918 960

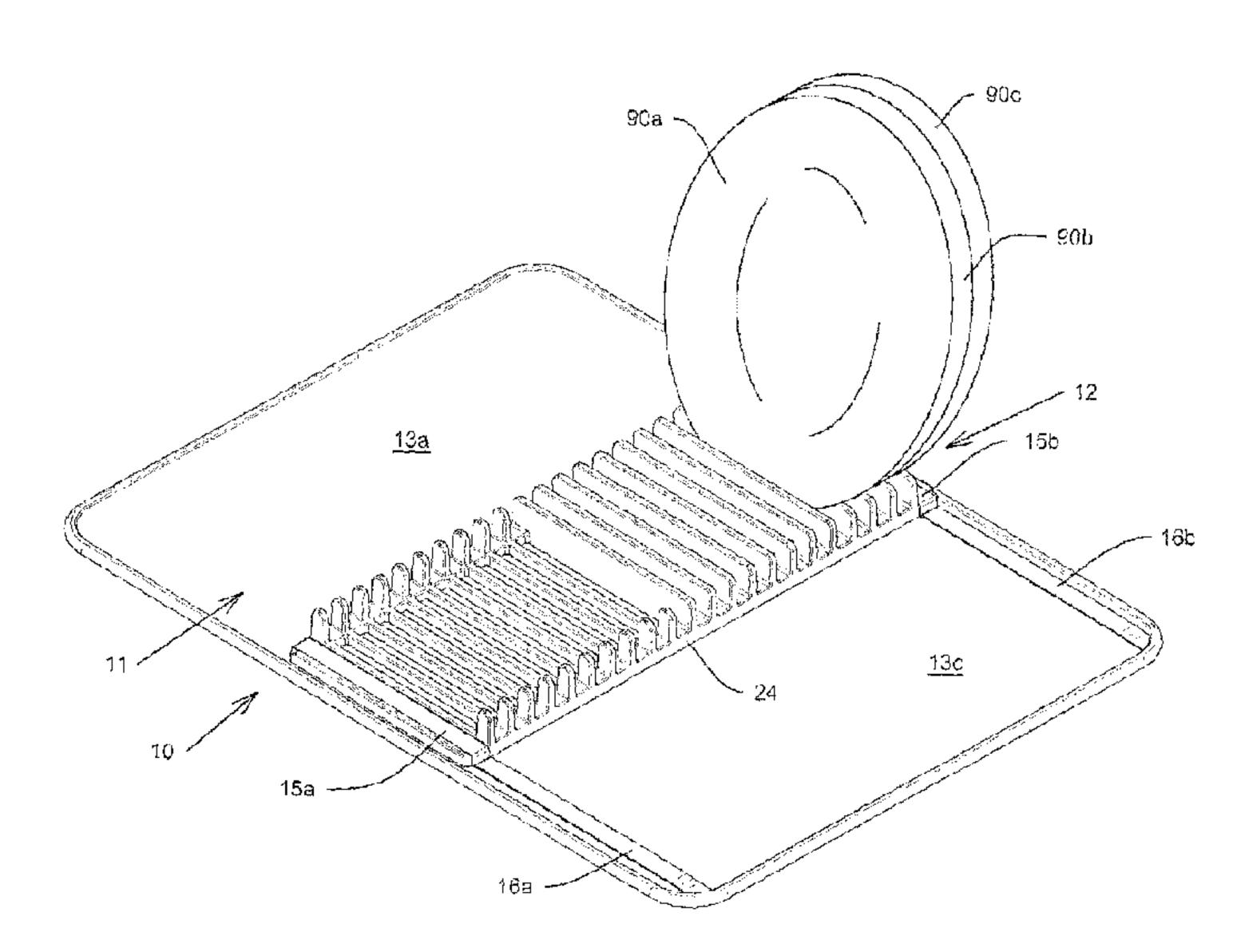
(12) BREVET CANADIEN CANADIAN PATENT

(13) **C**

- (22) Date de dépôt/Filing Date: 2016/01/25
- (41) Mise à la disp. pub./Open to Public Insp.: 2017/06/22
- (45) Date de délivrance/Issue Date: 2018/10/30
- (30) Priorité/Priority: 2015/12/22 (US14/978,506)
- (51) Cl.Int./Int.Cl. A47L 19/00 (2006.01), A47L 19/04 (2006.01)
- (72) Inventeur/Inventor: GREEN, DAVID, CA
- (73) Propriétaire/Owner: UMBRA LLC, US
- (74) Agent: BLAKE, CASSELS & GRAYDON LLP

(54) Titre: COMBINAISON DE TAPIS ET DE SECHOIR DE VAISSELLE

(54) Title: COMBINATION DISH DRYING MAT AND RACK



(57) Abrégé/Abstract:

A combination dish drying mat and rack, including a mat and a rack. The mat has a top surface, bottom surface, and a plurality of sides. The rack has a base resting upon at least a portion of the top surface of the mat in an open position. The rack has a plurality of ribs extending upwardly from the base, which form a corresponding plurality of channels, and the plurality of ribs and channels are operatively arranged to hold kitchenware. The rack also has a plurality of protrusions extending upwardly from the base and arranged in pairs. Each protrusion of each pair is disposed opposite one another laterally across the base of the rack. The rack also has a plurality of slots recessed within the base that are co-planar and parallel to one another and the plurality of protrusions and slots are operatively arranged to hold kitchenware.



ABSTRACT OF THE DISCLOSURE

A combination dish drying mat and rack, including a mat and a rack. The mat has a top surface, bottom surface, and a plurality of sides. The rack has a base resting upon at least a portion of the top surface of the mat in an open position. The rack has a plurality of ribs extending upwardly from the base, which form a corresponding plurality of channels, and the plurality of ribs and channels are operatively arranged to hold kitchenware. The rack also has a plurality of protrusions extending upwardly from the base and arranged in pairs. Each protrusion of each pair is disposed opposite one another laterally across the base of the rack. The rack also has a plurality of slots recessed within the base that are co-planar and parallel to one another and the plurality of protrusions and slots are operatively arranged to hold kitchenware.

COMBINATION DISH DRYING MAT AND RACK

FIELD OF THE INVENTION

[0001] The invention broadly relates to a combination dish drying mat and rack for kitchenware and, more particularly, to an improved dish drying mat and rack for dishware, flatware, etc., that can be disassembled for more efficient cleaning and folded for compact storage.

BACKGROUND OF THE INVENTION

Dish drying mats and racks are well known articles of manufacture, which provide an area to dry and store various types of kitchenware, such as plates, bowls, glasses, utensils, *etc.* Generally, a dish drying rack includes a base and a plurality of drainage slots operatively arranged to hold and dry kitchenware. Similarly, a dish drying mat also provides an area to dry and store various types of kitchenware. However, drying mats typically include a cushioned planar surface instead of a base and plurality of drainage slots as seen in drying racks. Over the years, many devices have been developed to make the process of cleaning and drying dishes more efficient. Automatic, electric dishwasher appliances are well known, but expensive, and not affordable by everyone. Therefore, there is a continuing need for improved devices and methods for the manual washing and drying of dishes, flatware, cookware, and the like.

[0003] After being washed, dishes are usually placed in a drying rack on a countertop adjacent to a sink to expedite the air-drying process. A problem with prior dish drying racks is that some require the use of a towel underneath the rack to prevent water runoff from accumulating on the counter and subsequent spilling over onto the floor.

Another problem with prior dish drying racks is that some do not include an area for holding utensils. In these racks, the utensils tend to fall through the drainage slots onto the towel beneath the dish drying rack, and thus, never properly dry. While there are prior dish drying racks that do include a separate utensil area, they tend to be large and bulky, and therefore, difficult to clean and store.

[0005] A problem with prior dish drying mats is that most do not include any type of divisor, recess, or channel for holding plates vertically or for holding utensils. Therefore, it is difficult to dry and store a plurality of plates simultaneously on a drying mat as the plates occupy a large volume of space when stored horizontally on a drying mat.

[0006] Thus, there is a long-felt need for a combination dish drying mat and rack that includes a rack portion which rests upon a mat portion to allow water to runoff through apertures in the rack and be absorbed by the mat. There is also a long-felt need for an aesthetically pleasing combination dish drying rack and mat, from which water runoff can flow through the rack and be absorbed by the mat below. In addition, there is a long-felt need for a combination dish drying rack

and mat that includes both a dishware area and a utensil area as well as the ability to be dismantled and folded for easy cleaning and compact storage.

BRIEF SUMMARY OF THE INVENTION

The present invention is a combination dish drying mat and rack generally including a mat and a rack. The mat has a top surface, bottom surface, and a plurality of sides. The rack has a base which rests upon at least a portion of the top surface of the mat in an open position. The rack has a plurality of ribs extending upwardly from the base and a corresponding plurality of channels formed by the plurality of ribs. The plurality of ribs and channels are operatively arranged to hold kitchenware in a substantially upright position. Preferably, the plurality of channels are co-planar and parallel to one another and the plurality of ribs are co-planar and parallel to one another and the plurality of ribs and channels extend laterally across the base of the rack. Additionally, the rack further includes a plurality of protrusions extending upwardly from the base and a plurality of slots recessed within the base. The plurality of protrusions are arranged in pairs and each protrusion of each pair is disposed opposite one another laterally across the base of the rack and the plurality of slots are co-planar and parallel to one another. Preferably, the plurality of ribs and the plurality of protrusions are integral with the base of the rack.

In one embodiment, the mat further includes at least one attachment means secured to the top surface of the mat and operatively arranged to secure the rack to the mat. Preferably, the at least one attachment means is at least one strap and the at least one strap is arranged to removably secure the base of the rack to the top surface of the mat. However, the at least one attachment means may be any suitable attachment means known in the art, such as a strap, hook and loop fastener, button, etc.

In another embodiment, the mat further includes a plurality of segments and at least one fold, wherein each fold is disposed as a divisor between each of two segments and the mat is operatively arranged to be foldable about the folds into a closed position. Preferably, the mat includes three segments and two folds and the rack rests upon the top surface of the second segment. The first segment is folded about the first fold and is disposed atop the rack and the third segment is folded about the second fold and is disposed atop the first fold. Additionally, the mat further includes at least one attachment means secured to the bottom surface of the mat to secure the mat in a closed position. Preferably, the at least one attachment means is a strap and the at least one strap removably secures the mat when folded into a closed position. However, the at least one attachment means may be any suitable attachment means known in the art, such as a strap, hook and loop fastener, button, etc.

[0010] In one embodiment, the rack is made of a substantially rigid material, such as plastic, metal, wood, etc. However, it should be appreciated that the rack can be made of any suitable

material known in the art. Conversely, the mat is made of a substantially flexible material, such as microfiber, cloth, etc. However, it should be appreciated that the mat can be made of any suitable material known in the art.

[0011] In another embodiment, both the mat and rack are substantially rectangular in shape. However, it should be appreciated that both the mat and rack can be any suitable shape and of any suitable dimensions known in the art.

[0012] These and other objects and advantages of the present invention will be readily appreciable from the following description of preferred embodiments of the invention and from the accompanying drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The nature and mode of operation of the present invention will now be more fully described in the following detailed description of the invention in view of the accompanying drawing figures, in which:

Figure 1 is a perspective view of an embodiment of the present invention combination dish drying mat and rack, shown in a first open position and holding kitchenware items;

Figure 2 is a front perspective view of the combination dish drying mat and rack similar to the view shown in Figure 1, shown with the kitchenware removed;

Figure 3 is a perspective view of another embodiment of the combination dish drying mat and rack similar to the view shown in Figure 2, but shown in a second open position;

Figure 4 is an exploded view of the combination dish drying mat and rack of Figure 2; Figure 5 is a top plan view of the combination dish drying mat and rack of Figure 2;

Figure 6 is a bottom plan view of the combination dish drying mat and rack of Figure

2;

Figure 7 is a front elevational view of the combination dish drying mat and rack of

Figure 2;

Figure 8 is a rear elevational view of the combination dish drying mat and rack of

Figure 2;

Figure 9 is a left side elevational view of the combination dish drying mat and rack of

Figure 2;

Figure 10 is a right side elevational view of the combination dish drying mat and rack of Figure 2; and,

Figure 11 is a perspective view of another embodiment of the combination dish drying mat and rack of Figure 2, but shown in a closed position.

DETAILED DESCRIPTION OF THE INVENTION

[0014] At the outset, it should be appreciated that like drawing numbers on different drawing views identify identical, or functionally similar, structural elements of the invention. It also should be appreciated that figure proportions and angles are not always to scale in order to clearly portray the attributes of the present invention.

[0015] While the present invention is described with respect to what is presently considered to be the preferred aspects, it is to be understood that the invention as claimed is not limited to the disclosed aspects. The present invention is intended to include various modifications and equivalent arrangements within the spirit and scope of the appended claims.

[0016] Furthermore, it is understood that this invention is not limited to the particular methodology, materials and modifications described and, as such, may, of course, vary. It is also understood that the terminology used herein is for the purpose of describing particular aspects only, and is not intended to limit the scope of the present invention, which is limited only by the appended claims.

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood to one of ordinary skill in the art to which this invention belongs. Although any methods, devices or materials similar or equivalent to those described herein can be used in the practice or testing of the invention, the preferred methods, devices, and materials are now described.

Adverting now to the figures, Figure 1 is a perspective view of the present invention combination dish drying mat and rack 10, hereinafter referred to as "dish drying assembly 10." Dish drying assembly 10 includes mat 11 and rack 12. Mat 11 is adapted to rest upon a planar surface, such as a countertop and operatively arranged to hold and store kitchenware such as dishes, cups, utensils, etc. Similarly, rack 12 is operatively arranged to hold and store kitchenware, such as plurality of dishes 90a, 90b, and 90c; however, unlike mat 11, rack 12 holds the items in a substantially upright manner.

[0019] Figure 2 is a perspective view of dish drying assembly 10, similar to that of Figure 1, but shown with plurality of dishes 90a, 90b, and 90c removed. Additionally, Figure 2 shows dish drying assembly 10 in a first open position.

[0020] Similar to Figure 2, Figure 3 is a perspective view of dish drying assembly 10. However, Figure 3 shows dish drying assembly 10 in a second open position.

[0021] Figure 4 is an exploded view of dish drying assembly 10.

[0022] Figure 5 is a top plan view of dish drying assembly 10 and Figure 6 is a bottom plan view of dish drying assembly 10.

[0023] Figure 7 is a front elevational view of dish drying assembly 10 and Figure 8 is a rear elevational view of the dish drying assembly 10.

[0024] Figure 9 is a left side elevational view of dish drying assembly 10 and Figure 10 is a right side elevational view of dish drying assembly 10.

[0025] Figure 11 is a perspective view of another embodiment of dish drying assembly 10, shown in a closed position.

[0026] As shown in Figures 1 through 11, dish drying assembly 10 generally includes mat 11 and rack 12. Mat 11 has top surface segments 13a, 13b, and 13c, bottom surface segments 14a, 14b, and 14c, and plurality of sides 18a, 18b, 18c, and 18d. Preferably, first side 18a and third side 18c are parallel to one another and second side 18b and fourth side 18d are parallel to one another. Additionally, second top surface segment 13b of mat 11 includes straps 15a, 15b. Similarly, third top surface segment 13c includes straps 16a, 16b. As shown in Figure 2, rack 12 has base 24, which rests upon top surface segment 13b (shown in Figure 4) of mat 11 forming a first open position. When in the first open position, strap 15a and strap 15b are disposed on opposite one another and removably secure base 24 of rack 12 to mat 11. Similarly, in Figure 3, rack 12 has base 24; however, base 24 rests upon top surface segment 13c forming a second open position. When in the second open position, strap 16a and strap 16b are disposed opposite one another and removably secure base 24 of rack 12 to mat 11. This second open position provides a user with additional space for drying larger items, such as serveware, on mat 11. Although the figures show dish drying assembly in a first open position and a second open position, it should be readily apparent to those having ordinary skill in the art that other configurations are possible. Furthermore, it should be appreciated that while the rack is preferably secured to the mat via a plurality of straps, the attachment means for securing the rack to the mat may be any suitable attachment means known in the art, such as a strap, hook and loop fastener, button, etc.

Preferably, first rack edge 21a and third rack edge 21c are parallel to one another and second rack edge 21b and fourth rack edge 21d are parallel to one another. Rack 12 has plurality of ribs 26a, 26b...26m extending upwardly from base 24 and corresponding plurality of channels 28a, 28b...28k formed by plurality of ribs 26a, 26b...26m. Plurality of ribs 26a, 26b...26m and plurality of channels 28a, 28b...28m are operatively arranged to hold kitchenware in a substantially upright position. Preferably, plurality of channels 28a, 28b...28k are co-planar and parallel to one another and plurality of ribs 26a, 26b...26m are co-planar and parallel to one another and plurality of ribs 26a, 26b...26m and plurality of channels 28a, 28b...28k run laterally across base 24 of rack 12 from first rack edge 21a to third rack edge 21c. To facilitate drainage of water runoff, plurality of channels 28a, 28b, 28c, 28d, 28e, 28f, 28g, 28h, 28i, 28j, and 28k are integral with base 24 of rack 12. Preferably, plurality of ribs 26a, 26b...26m are parallel to one another, are of substantially the same width and

length, and are equally spaced with respect to one another. Similarly, plurality of channels **28a**, **28b...28k** are parallel to one another, are of substantially the same width and length, and are equally space with respect to one another.

In particular, channel 28a is formed by base 24 and two adjacent ribs 26a, 26b; channel 28b is formed by base 24 and two adjacent ribs 26c, 26d; channel 28d is formed by base 24 and two adjacent ribs 26d, 26e; channel 28e is formed by base 24 and two adjacent ribs 26d, 26e; channel 28e is formed by base 24 and two adjacent ribs 26f, 26g; channel 28g is formed by base 24 and two adjacent ribs 26g, 26h; channel 28h is formed by base 24 and two adjacent ribs 26g, 26h; channel 28h is formed by base 24 and two adjacent ribs 26j, 26k; and two adjacent ribs 26j, 26k; and channel 28k is formed by base 24 and two adjacent ribs 26j, 26k; and channel 28k is formed by base 24 and two adjacent ribs 26k, 26m. Preferably, the height of each rib 26a, 26b...26m is substantially equal, although it is should be apparent that ribs 26a, 26b...26m of dish drying assembly 10 may vary in height. Although dish drying assembly 10 includes twelve (12) ribs and eleven (11) channels in a preferred embodiment, it is should be apparent that dish drying assembly 10 may include a fewer or greater number of ribs and channels.

Moreover, rack 12 further includes first plurality of protrusions 22a, 22b...22j, second plurality of protrusions 23a, 23b...23j, and plurality of slots 25a, 25b...25j recessed within base 24. Preferably, first plurality of protrusions 22a, 22b...22j are of uniform height, identical to one another, and extend upwardly from base 24. Similarly, second plurality of protrusions 23a, 23b...23j are of uniform height, identical to one another, and extend upwardly from base 24. First plurality of protrusions 22a, 22b...22j and second plurality of protrusions 23a, 23b...23j are arranged in complementary pairs, where each protrusion of each pair is disposed opposite one another laterally across base 24 of rack 12 from first rack edge 21a to third rack edge 21c. Plurality of slots 25a, 25b...25j are co-planar and parallel to one another and run laterally across base 24 of rack 12 from first rack edge 21a to third rack edge 21a to third rack edge 21a to third rack edge 21a. Preferably, first plurality of protrusions 22a, 22b...22j, and second plurality of protrusions 23a, 23b...23j are integral with base 24 of rack 12. To facilitate drainage of water runoff, plurality of slots 25a, 25b, 25c, 25d, 25e, 25f, 25g, 25h, 25i, and 25j are integral with base 24 of rack 12.

Preferably, each slot is bounded by two complementary pairs of protrusions. In particular, slot 25a is bounded by pair of protrusions 22a, 23a and pair of protrusions 22b, 23b; slot 25b is bounded by pair of protrusions 22b, 23b and pair of protrusions 22c, 23c; slot 25c is bounded by pair of protrusions 22c, 23c and pair of protrusions 22d, 23d; slot 25d is bounded by pair of protrusions 22d, 23d and pair of protrusions 22e, 23e; slot 25e is bounded by pair of protrusions 22e, 23e and pair of protrusions 22f, 23f; slot 25f is bounded by pair of protrusions 22f, 23f and pair of protrusions 22g, 23g; slot 25g is bounded by pair of protrusions 22g, 23g and pair of protrusions 22h, 23h; slot 25h is bounded by pair of protrusions 22h, 23h and pair of protrusions 22i, 23i; and

slot 25i is bounded by pair of protrusions 22i, 23i and pair of protrusions 22j, 23j. Slot 25j is the exception as it is bounded by pair of protrusions 22j, 23j, and rib 26a. Preferably, plurality of slots 25a, 25b...25j are parallel to one another, are of substantially the same width and length, and are equally spaced with respect to one another. Although dish drying assembly 10 includes ten (10) complementary pairs of protrusions and ten (10) slots in a preferred embodiment, it is should be apparent that dish drying assembly 10 may include a fewer or greater number of pairs of protrusions and slots.

[0031] As shown in Figure 6, mat 11 further includes folds 19a, 19b. Each fold 19a, 19b extends laterally across mat 11 from second mat side 18b to fourth mat side 18d and acts as a divisor between each of two segments. In particular, first fold 19a divides first bottom surface segment 14a and second bottom surface segment 14b as well as the corresponding first top surface segment 13a and second top surface segment 13b. Similarly, second fold 19b divides second bottom surface segment 14b and third bottom surface segment 14c as well as the corresponding second top surface segment 13b and third top surface segment 13c. Mat 11 is operatively arranged to be foldable about folds 19a, 19b into a closed position. As shown in Figure 11, third top surface segment 13c is folded about second fold 19b and contacts rack 12. First top surface segment 13a is folded about first fold 19a and contacts third bottom surface segment 14c. Preferably, mat 11 further includes bottom strap 29 secured to first bottom surface segment 14a which is lifted and pulled approximately 180 degrees by a user around mat 11 to contact second bottom surface 14b and secure mat 11 in the closed position. It should be appreciated that while dish drying assembly 10 is preferably secured in a closed position via a strap, the attachment means for securing the dish drying assembly in a closed position may be any suitable attachment means known in the art, such as a strap, hook and loop fastener, button, etc.

Dish drying assembly 10 is disassembled in the first open position by lifting straps 15a, 15b up and lifting and/or sliding rack edges 21b, 21d from underneath straps 15a, 15b, respectively. Similarly, dish drying assembly 10 is disassembled in the second open position by lifting straps 16a, 16b up and lifting and/or sliding rack edges 21b, 21d from underneath straps 16a, 16b, respectively. Once disassembled, rack 12 and mat 11 can be cleaned efficiently and stored compactly. However, it should be appreciated that dish drying assembly 10 need not be disassembled to be stored, and as mentioned previously, dish drying assembly 10 may be stored in the aforementioned closed position.

[0033] Preferably, rack 12 is made of a substantially rigid and water resistant material, such as plastic, so that it can endure rigorous use without the possibility of warping due to water damage. However, it should be appreciated that the rack can be made of any suitable material known in the art, such as metal wood, etc. Conversely, mat 11 is made of a substantially flexible and absorbent

material, such as microfiber, cloth, etc. However, it should be appreciated that the mat can be made of any suitable material known in the art as well.

Thus, it is seen that the objects of the present invention are efficiently obtained, although modifications and changes to the invention should be readily apparent to those having ordinary skill in the art, which modifications are intended to be within the spirit and scope of the invention as claimed. It also is understood that the foregoing description is illustrative of the present invention and should not be considered as limiting. Therefore, other embodiments of the present invention are possible without departing from the spirit and scope of the present invention.

What Is Claimed Is:

1. A combination dish drying mat and rack, comprising:

a mat having a top surface, bottom surface, a plurality of sides, a plurality of segments and at least two folds, wherein each fold is disposed as a divisor between each of two segments and the mat is operatively arranged to be foldable about the folds into a closed position; and,

a rack having a base, wherein the base of the rack rests upon at least a portion of the top surface of the mat in an open position, the rack having a plurality of ribs extending upwardly from the base and a plurality of channels, wherein the plurality of ribs form the corresponding plurality of channels, the plurality of ribs and channels are operatively arranged to hold kitchenware in a substantially upright position, and the rack is arranged to be disposed within at least a portion of the mat when the mat is folded into a closed position,

the rack further comprising a plurality of protrusions extending upwardly from the base and a plurality of slots recessed within the base, wherein the plurality of protrusions are arranged in pairs and each protrusion of each pair is disposed opposite one another laterally across the base of the rack and the plurality of slots are co-planar and parallel to one another.

- 2. The combination dish drying mat and rack of Claim 1, wherein the plurality of channels are co-planar and parallel to one another and the plurality of ribs are co-planar and parallel to one another and the plurality of ribs and channels extend laterally across the base of the rack.
- 3. The combination dish drying mat and rack of Claim 1 or 2, wherein the plurality of ribs and the plurality of protrusions are integral with the base of the rack.
- 4. The combination dish drying mat and rack of any one of Claims 1-3, the mat further comprising at least one attachment means secured to the top surface of the mat and operatively arranged to secure the rack to the mat.
- 5. The combination dish drying mat and rack of Claim 4, wherein the at least one attachment means is a strap and the at least one strap is arranged to removably secure the base of the rack to the top surface of the mat.
- 6. The combination dish drying mat and rack of any one of Claims 1-5, wherein the mat includes three segments and two folds and the rack rests upon the top surface of the second

segment, wherein the first segment is folded about the first fold and is disposed atop the rack and the third segment is folded about the second fold and is disposed atop the first fold.

- 7. The combination dish drying mat and rack of any one of Claims 1-3, the mat further comprising at least one attachment means secured to the bottom surface of the mat to secure the mat in a closed position.
- 8. The combination dish drying mat and rack of Claim 7, wherein the at least one attachment means is a strap and the at least one strap is arranged to removably secure the mat when folded into a closed position.
- 9. The combination dish drying mat and rack of any one of Claims 1-8, wherein the rack is made of a substantially rigid material.
- 10. The combination dish drying mat and rack of Claim 9, wherein the rack is made of plastic.
- 11. The combination dish drying mat and rack of any one of Claims 1-10, wherein the mat is made of a substantially flexible material.
- 12. The combination dish drying mat and rack of Claim 11, wherein the mat is made of microfiber.
- 13. The combination dish drying mat and rack of any one of Claims 1-12, wherein the mat is substantially rectangular in shape.
- 14. The combination dish drying mat and rack of any one of Claims 1-13, wherein the rack is substantially rectangular in shape.
- 15. A combination dish drying mat and rack, comprising:

a mat having a top surface, bottom surface, a plurality of sides, a plurality of segments and at least two folds, wherein each fold is disposed as a divisor between each of two segments and the mat is operatively arranged to be foldable about the folds into a closed position; and,

a rack having a base, wherein the base of the rack rests upon at least a portion of the top surface of the mat in an open position, the rack having:

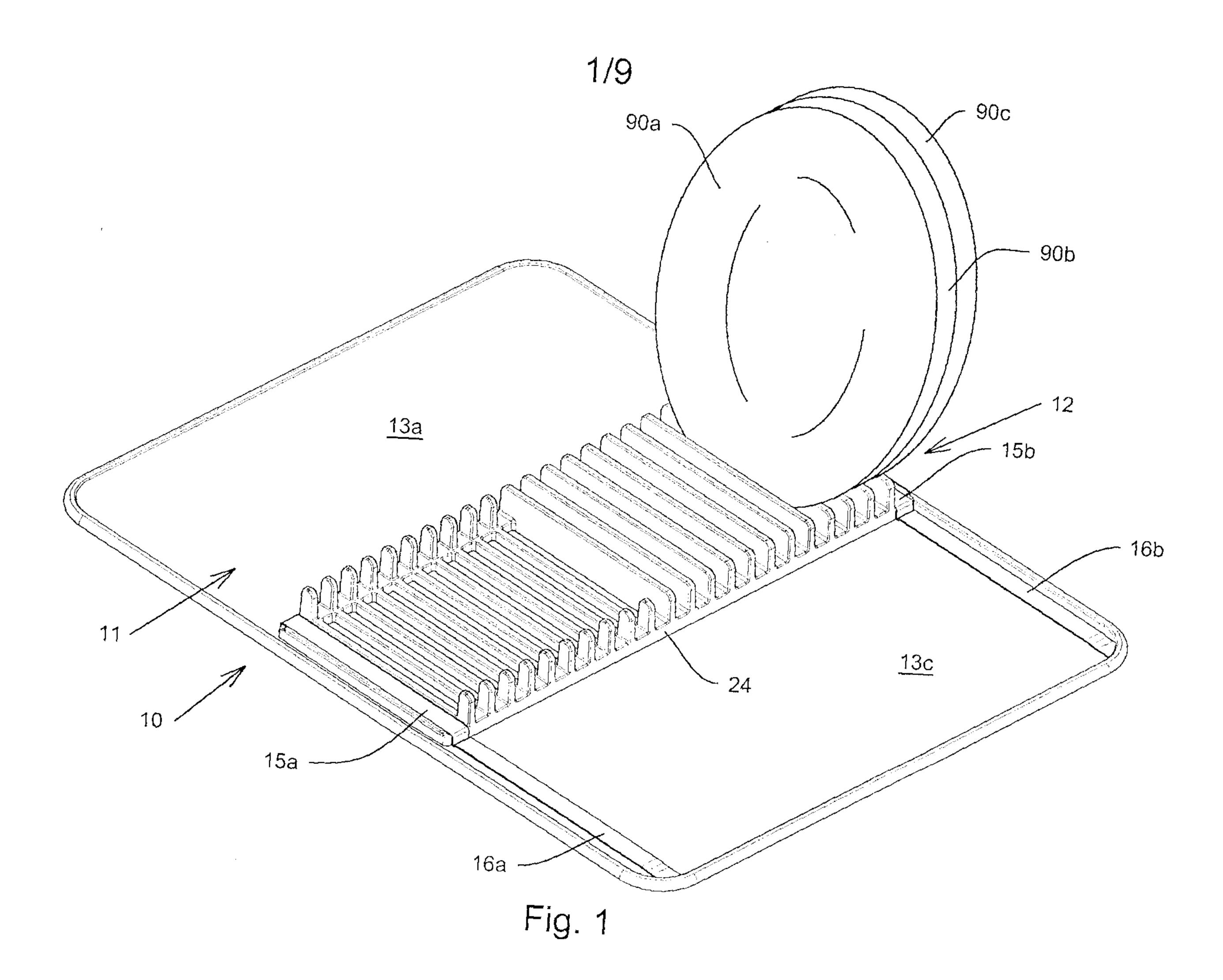
a plurality of ribs extending upwardly from the base;

a plurality of channels, wherein the plurality of ribs form the corresponding plurality of channels, and the plurality of ribs and channels are operatively arranged to hold kitchenware in a substantially upright position and the plurality of channels are co-planar and parallel to one another and the plurality of ribs are co-planar and parallel to one another;

a plurality of protrusions extending upwardly from the base, wherein the plurality of protrusions are arranged in pairs and each protrusion of each pair is disposed opposite one another laterally across the base of the rack; and,

a plurality of slots recessed within the base, wherein the plurality of slots are coplanar and parallel to one another and the plurality of protrusions and slots are operatively arranged to hold kitchenware and the rack is arranged to be disposed within at least a portion of the mat when the mat is folded into a closed position.

- 16. The combination dish drying mat and rack of Claim 15, the mat further comprising at least one attachment means secured to the top surface of the mat and operatively arranged to removably secure the base of the rack to the top surface of the mat.
- 17. The combination dish drying mat and rack of Claim 15 or 16, wherein the mat includes three segments and two folds and the rack rests upon the top surface of the second segment, wherein the first segment is folded about the first fold and is disposed atop the rack and the third segment is folded about the second fold and is disposed atop the first fold.



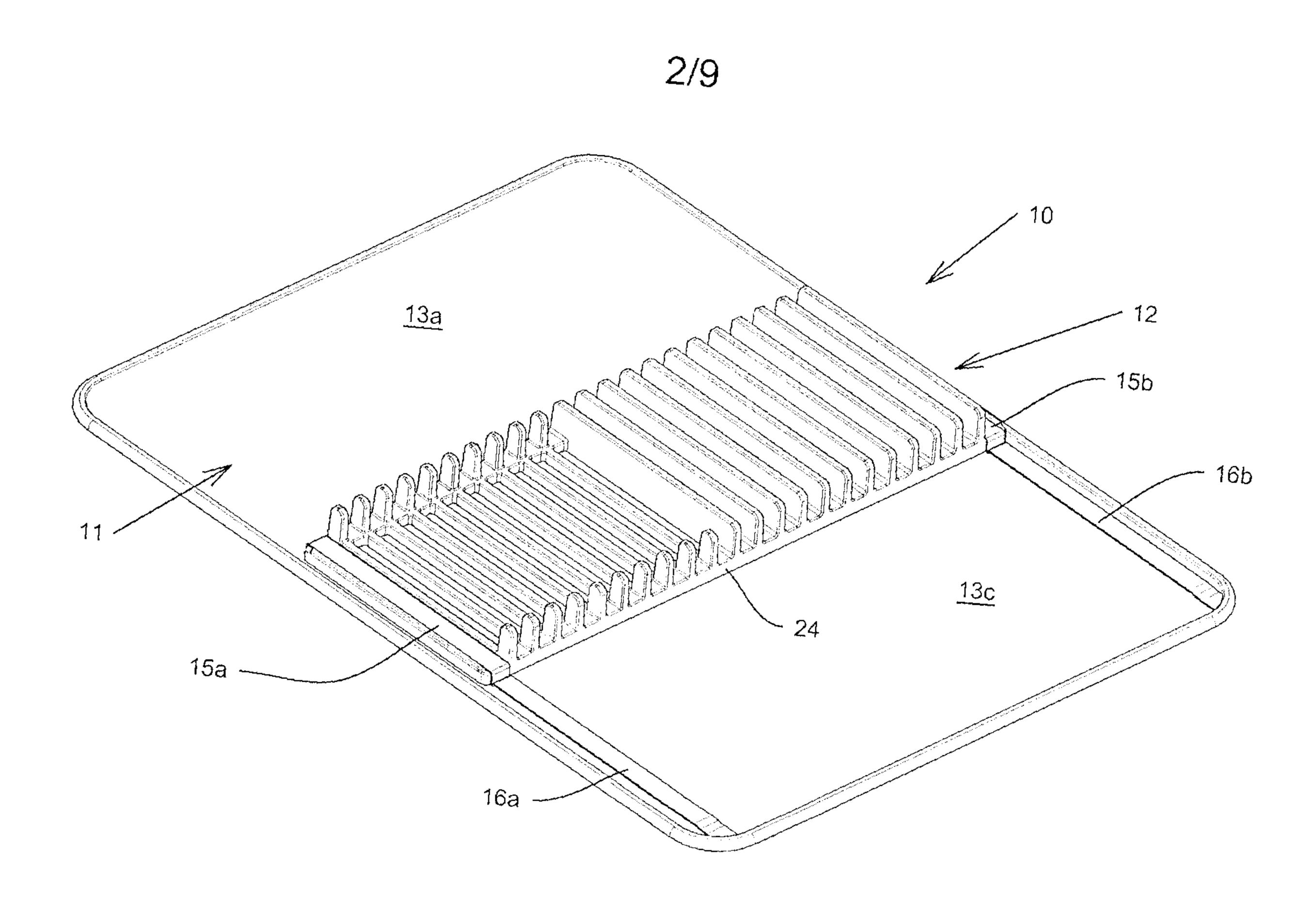


Fig. 2

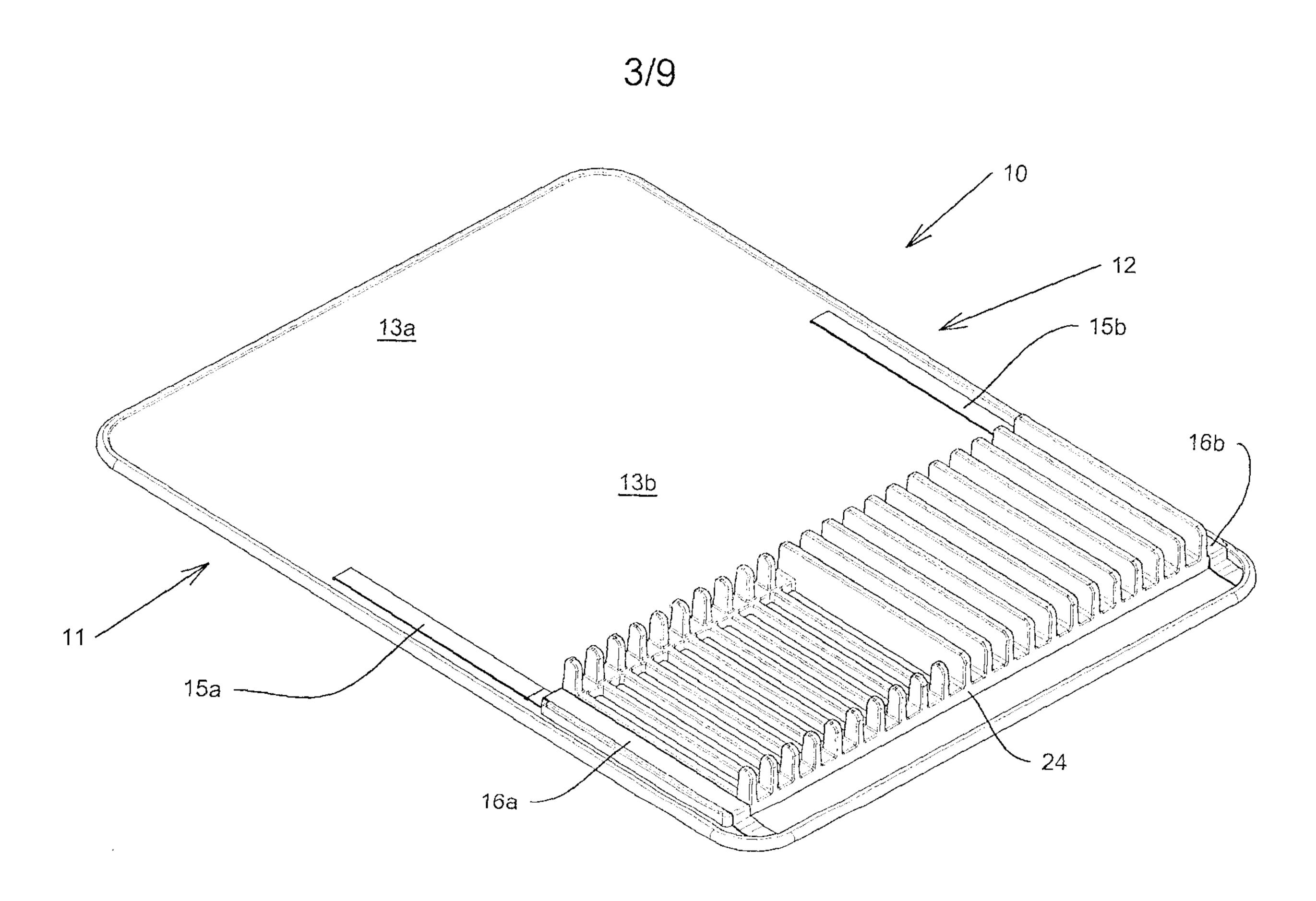


Fig. 3

4/9

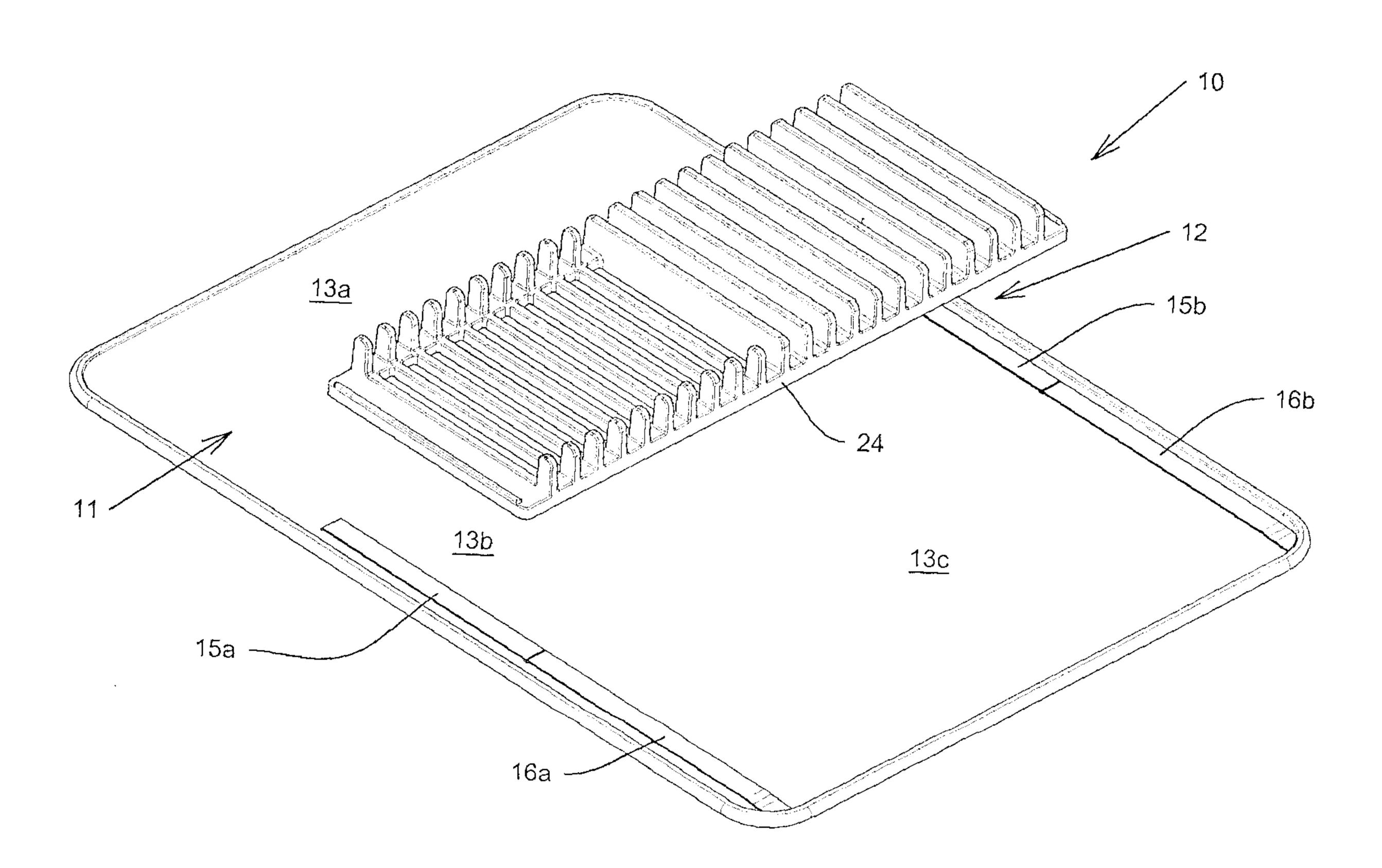
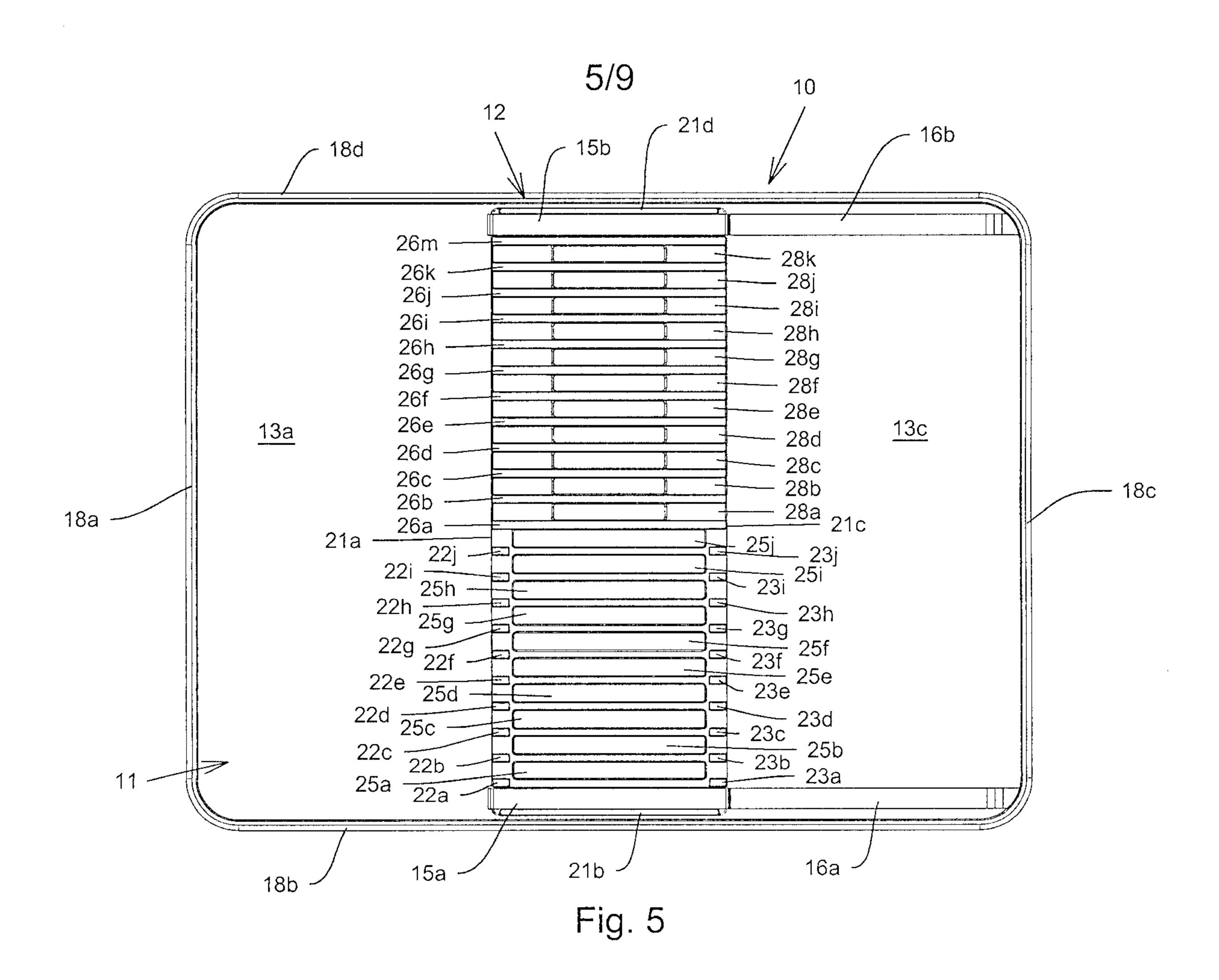


Fig. 4



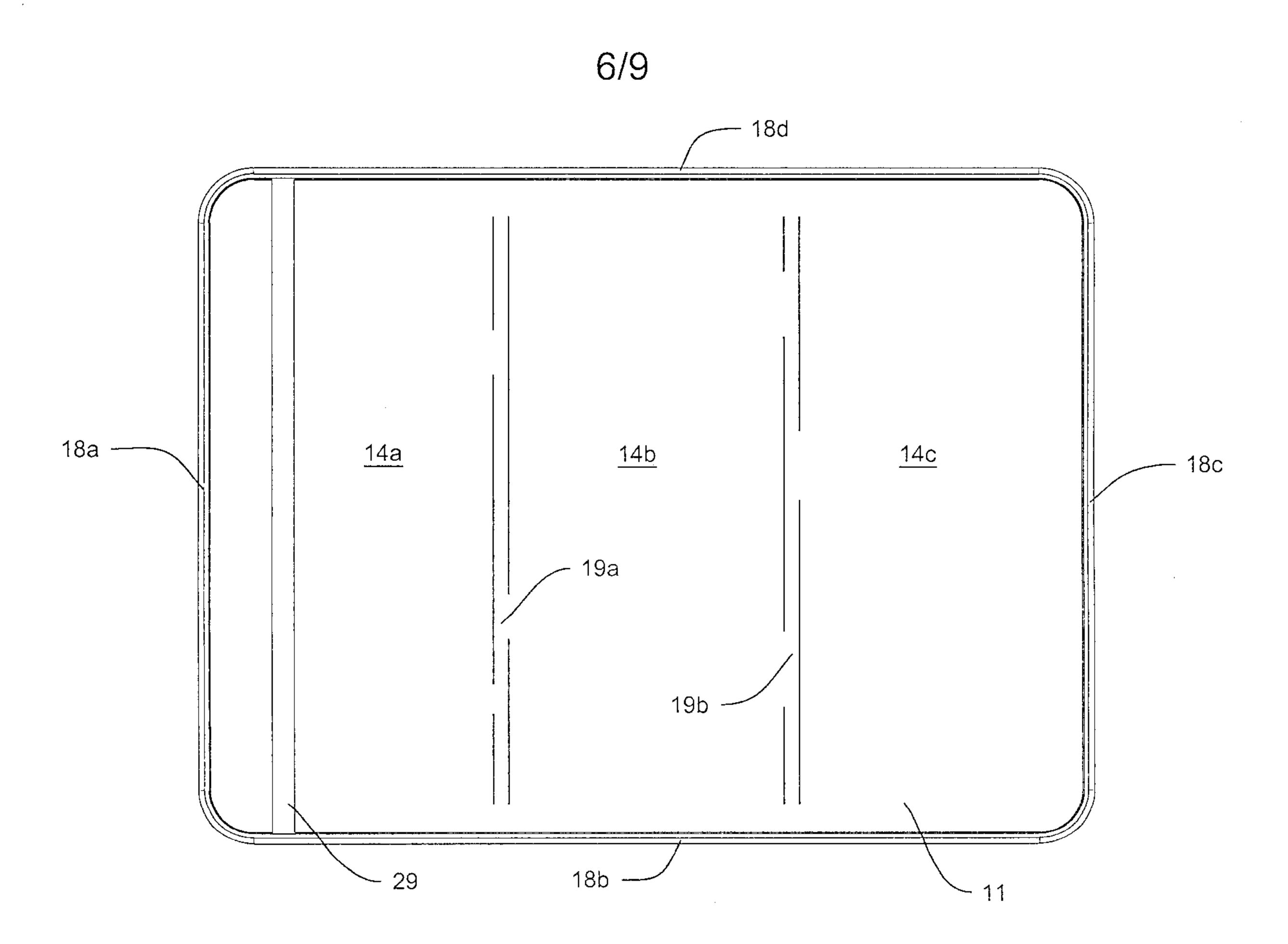


Fig. 6

7/9

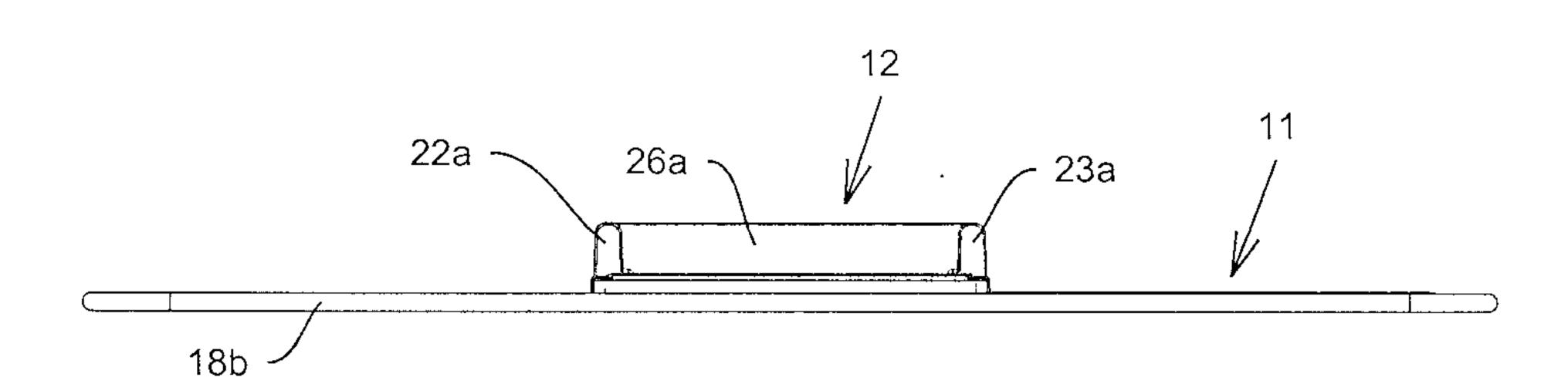


Fig. 7

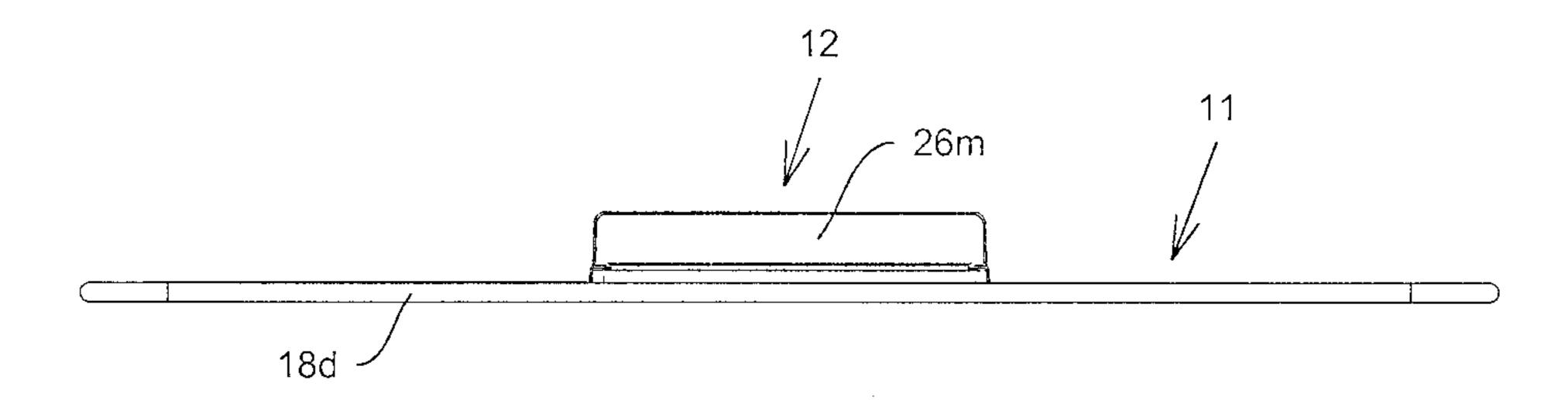
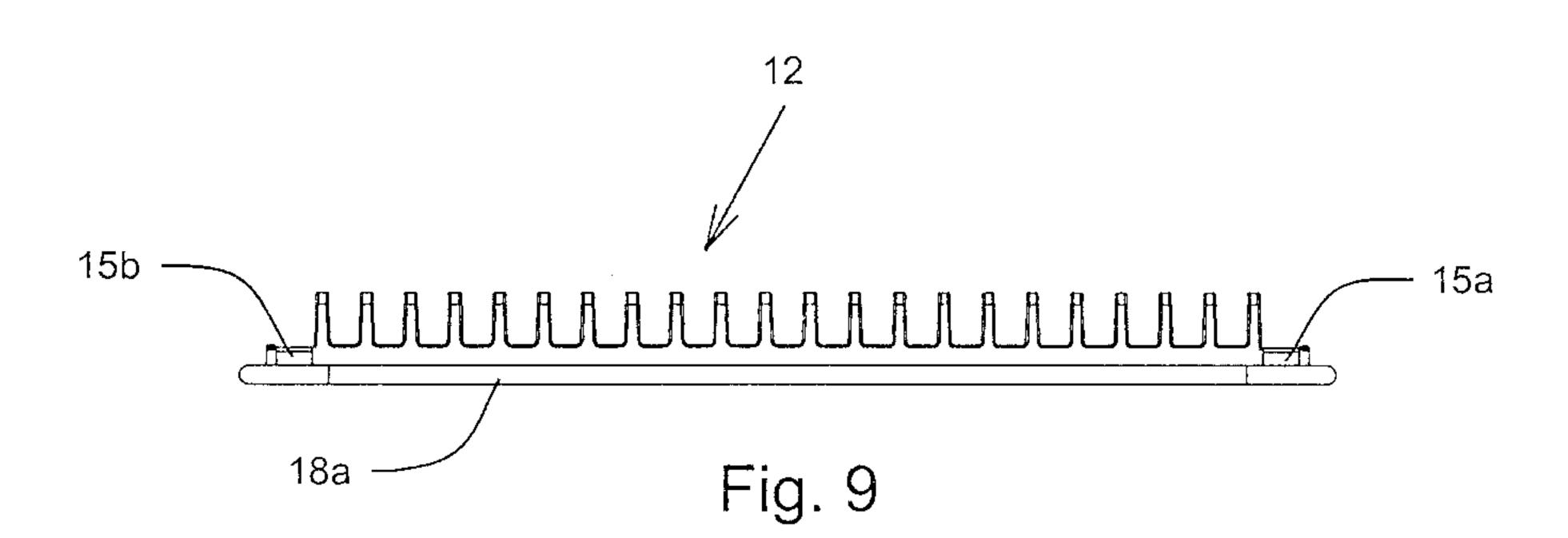


Fig. 8





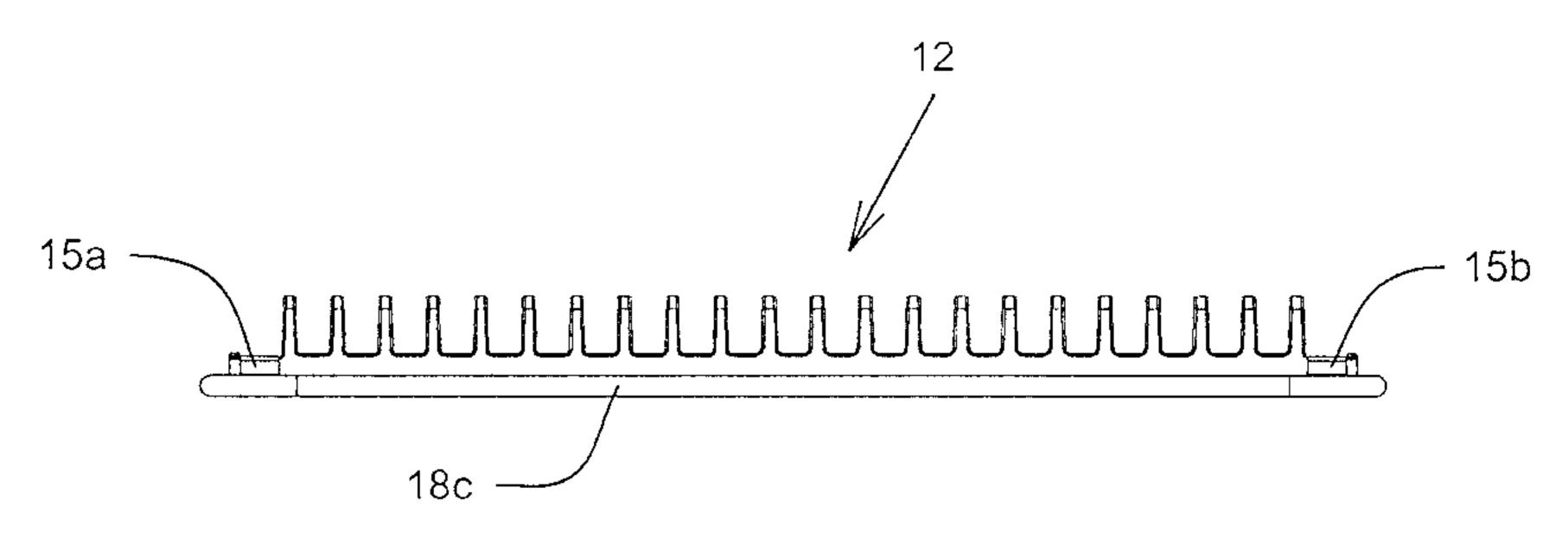


Fig. 10

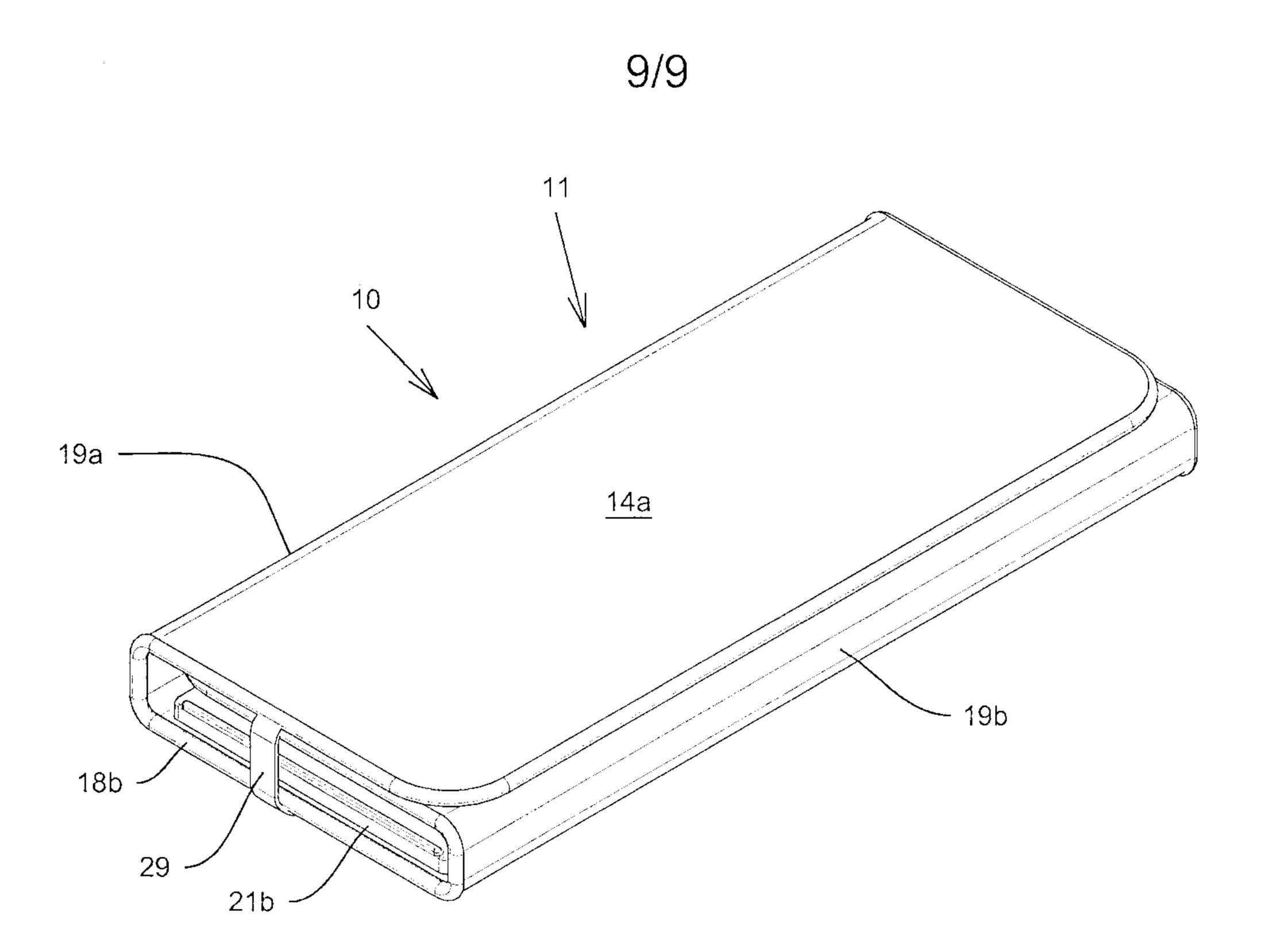


Fig. 11

