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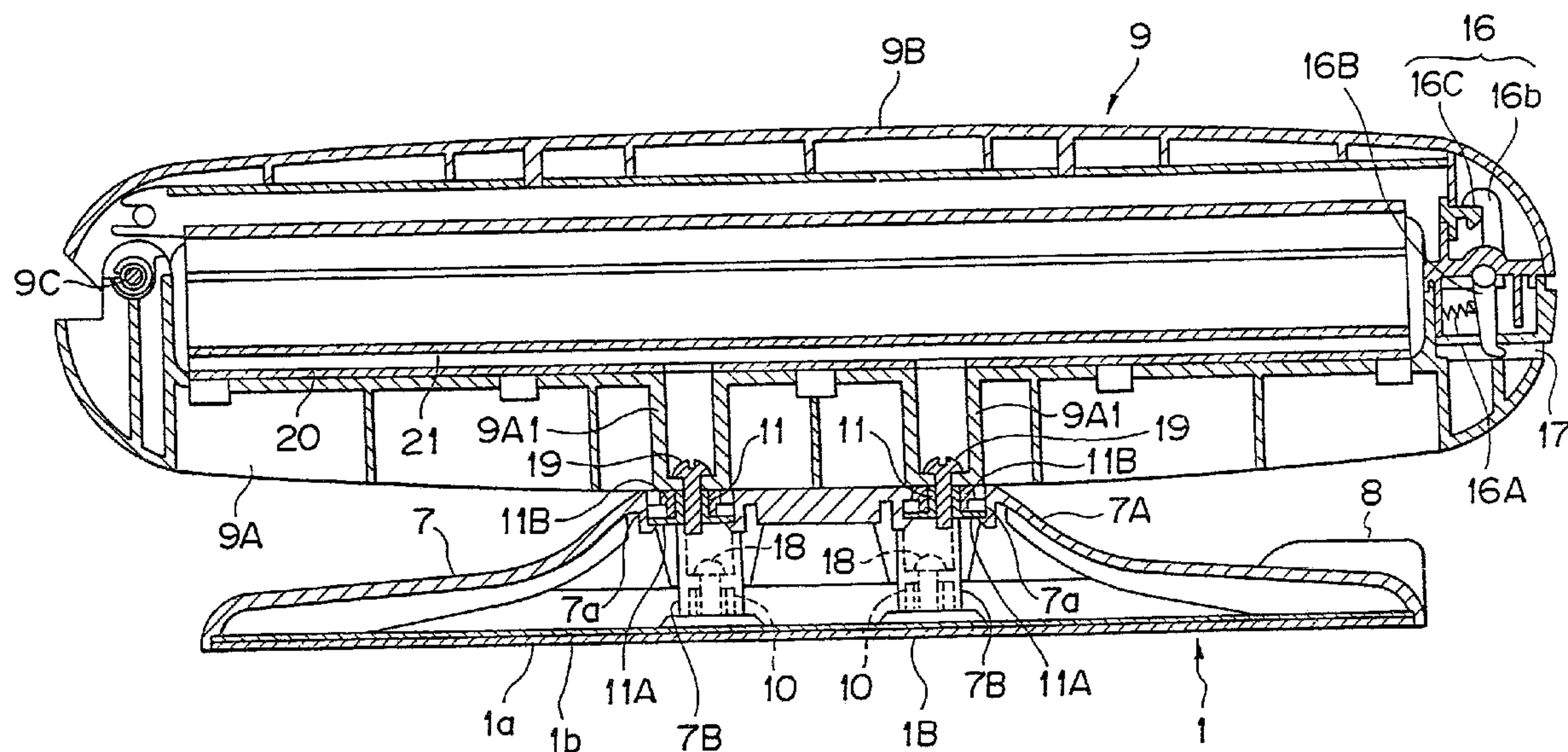
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(54) Titre : PORTE-BAGAGES POUR PAVILLON D'AUTOMOBILE

(54) Title: AN AUTOMOBILE ROOF CARRIER



(57) Abrégé/Abstract:

An automobile roof carrier which is provided herein is mainly composed of a magnetic base portion, a gripping portion for removal, a covering member and a loading article-holding portion. The covering member is integrally-joined over the magnetic base portion, while the magnetic base portion is covered by the covering member except in the attractive surface of the magnetic base portion and the gripping portion for removal. The loading article-holding portion is combined integrally in the upper part of the covering member, the loading article-holding portion being able to be opened and closed. A supplementary cover which is able to be opened and closed is attached to the covering member so that the gripping portion for removal may be hidden and exposed. A first locking mechanism is provided for maintaining the supplementary cover in its closed state. A second locking mechanism is provided for maintaining the loading article-holding portion in its closed state. A common key for releasing the locked states of these two locking mechanisms is provided. The automobile roof carrier further includes means for preventing the degradation of appearance, an increment increase of air flow resistance during driving, and a reduction of contacting area with the roof.

ABSTRACT

An automobile roof carrier which is provided herein is mainly composed of a magnetic base portion, a gripping portion for removal, a covering member and a loading article-holding portion. The covering member is integrally-joined over the magnetic base portion, while the magnetic base portion is covered by the covering member except in the attractive surface of the magnetic base portion and the gripping portion for removal. The loading article-holding portion is combined integrally in the upper part of the covering member, the loading article-holding portion being able to be opened and closed. A supplementary cover which is able to be opened and closed is attached to the covering member so that the gripping portion for removal may be hidden and exposed. A first locking mechanism is provided for maintaining the supplementary cover in its closed state. A second locking mechanism is provided for maintaining the loading article-holding portion in its closed state. A common key for releasing the locked states of these two locking mechanisms is provided. The automobile roof carrier further includes means for preventing the degradation of appearance, an increment increase of air flow resistance during driving, and a reduction of contacting area with the roof.

(a) TITLE OF THE INVENTION

An Automobile Roof Carrier

(b) TECHNICAL FIELD TO WHICH THE INVENTION RELATES

The present invention relates to an automobile roof carrier for transporting
5 elongated articles, e.g., skis.

(c) BACKGROUND ART

One example of a roof carrier for automobiles for transporting elongated articles,
e.g., skis, is provided in Published Japanese Utility Model Application Laid-Open
Hei 3 No. 42446 which disclosed a ski carrier which was provided with a magnetic base
10 that was attracted magnetically to the roof top of an automobile. Conventional ski
carriers of this kind included a magnetic base portion that was attracted magnetically to
the roof of an automobile.

The magnetic base portion was provided at an appropriate location of the outer
peripheral portion thereof with a gripping portion to facilitate removal. A semi-
15 cylindrical block was integrally-joined on the top central portion of the magnetic base
portion and was attached with a ski holder in a rotatable and vertically up-and-down
movable manner. This movement was achieved by means of a pair of right and left studs
that rotated forwardly and backwardly of the vehicle relative to a block on a rotating axis
as the centre thereof was changed from a horizontal position to an upright position. A
20 pair of skis was adapted to fit into a pair of fitting grooves which were formed side-by-
side in the ski holder when the ski holder was in the upright position. Then, the ski
holder was lowered by gravity mainly due to the weight of the skis so that ski holder was
thus engaged in the upright position. The engagement state can be released by raising
the ski holder so that the holder may again adopt a horizontal position.

25 In the prior art roof-top ski carrier described above, the attachment of the skis to
the ski holder was performed by fitting skis into ski-fitting grooves and thereafter binding
them with a rubber strap in an appropriate manner. The rubber strap was untied in order
that the skis may be removed. Consequently, the operation of attachment and removal
of skis was complicated, resulting in difficulty of attachment and removal. Besides, since

the skis were secured with a rubber strap, such secured state can be released easily by a third person, so that the skis were exposed to the danger of being stolen.

On the other hand, in the case where the ski carrier was not engaged, the ski carrier can be removed from the roof of an automobile by hooking ones fingers on a gripping portion in order to remove the carrier base by upward force. At this time, the base was being pulled up so that the attracted area of the magnetic base portion to the roof was reduced gradually. That prior art ski carrier can be easily-detached from the roof since the gripping portion for removal was also exposed outside. Accordingly, the ski carrier itself was exposed to a danger of being stolen.

In conclusion, the prior art, roof top ski carriers described above have no anti-theft measures. As a result, not only the skis, but also the roof carrier itself might be stolen, so that those roof top ski carriers suffered from low security.

(d) DESCRIPTION OF THE INVENTION

An object of a first aspect of the present invention is to solve the following problems: that is, low operativity due to complicated attachment and removal in attaching and removing articles to be loaded, e.g., skis, and the possibility and fear of the roof carrier and/or the skis being stolen since no anti-theft measures have been adopted.

Further, if, in order to avoid the theft of the loaded articles and the roof carrier itself and to improve the security, if any anti-theft measure is taken, degradation of appearance of the roof carrier at use might occur. Besides, the increment of air flow resistance at driving, or lowering of attraction of the magnetic base portion accompanied by the reduction of the contact area of the magnetic base portion with the roof may take place. Therefore, it is an object of a second aspect of the present invention to provide means for solving such problems.

By a broad aspect of this invention, an automobile roof carrier is provided comprising a magnetic base portion, which is magnetically-attracted onto an upper surface of a roof of an automobile. A gripping portion is provided for removal thereof, the gripping portion being formed at an appropriate position of the magnetic base portion. A covering member is disposed over the magnetic base portion and is integrally-united therewith, so as to cover the portion other than the attracted surface of

the magnetic base portion and the gripping portion for removal thereof. A loading article-holding portion is disposed above the covering member, and is integrally-joined thereto and has means to be opened and closed to hold articles. An auxiliary cover is attached to the covering member so as to be opened and closed to provide a lid over the gripping portion for removal from the top. A first locking mechanism is disposed in the auxiliary cover to be locked for maintaining the auxiliary cover in its closed state when the auxiliary cover is closed. A second locking mechanism is disposed in the loading article-holding portion to be locked for maintaining the loading article-holding portion in its closed state when the loading article-holding portion is closed. A common key is provided for unlocking the first and second locking mechanisms.

By a second aspect of this invention, an automobile roof carrier is provided comprising a magnetic base portion, which is magnetically-attracted onto an upper surface of a roof of an automobile. A gripping portion for removal thereof, the gripping portion being at an appropriate position of the magnetic base portion. A covering member is disposed over the magnetic base portion and is integrally-united therewith so as to cover the portion other than the attracted surface of the magnetic base portion and the gripping portion for removal thereof. A loading article-holding portion is disposed above the covering member, and is integrally-joined thereto and has means to be opened and closed to hold articles. An auxiliary cover is attached to the covering member so as to be opened and closed to provide a lid over the gripping portion for removal from the top. A first locking mechanism is disposed in the auxiliary cover to be locked for maintaining the auxiliary cover in its closed state when the auxiliary cover is closed. A second locking mechanism is disposed in the loading article-holding portion to be locked for maintaining the loading article-holding portion in its closed state when the loading article-holding portion is closed. A common key is provided for unlocking the first and second locking mechanisms. A plurality of first joining members is provided, each of the first joining members having catching means which are formed with a cutout portion, and which are disposed in appropriate, peripheral positions on the magnetic base portion. A plurality of second joining members is provided which are disposed on the undersurface of the covering member in positions corresponding to the respective first

joining members, and extend downwardly. Each of the second joining members are constructed of a boss element and an interfering element which is attached to the lower end of the boss element. The corresponding pairs of first and second joining members are engaged such that the boss portions when the magnetic base portion and the covering member are united integrally. In each pair of the joining members, a clearance in a radial direction of the boss element between the inside edge of the cutout portion and the outside edge of the boss element is created across at least semicircular range.

By one variant of these two broad aspects of this invention, the loading article is skis.

According to a broad aspect of the present invention then, in a case where the roof carrier is attached to an automobile roof by magnetic attraction of the magnetic base portion, the gripping portion for removal can be concealed by the auxiliary cover, and the hidden state of the gripping portion for removal can be maintained by the first locking mechanism.

In aspects of the present invention, removal of the roof carrier from the roof can only be carried out by unlocking the first locking mechanism with the unlocking key to allow the auxiliary cover to be opened, exposing the gripping portion for removal by opening the auxiliary cover, then pulling up the gripping portion for removal while gripping it with ones fingers. The removal of the roof carrier will be completed by continuing the pulling operation gradually to reduce the attracted area of the magnetic base portion to the roof.

On the other hand, in aspects of the present invention, attachment of the loading articles, e.g., skis to the roof carrier is carried out by a simple single touch operation of releasing the loading article-holding portion, setting the skis, or any other articles, on the released loading article-holding portion, then returning the loading article-holding portion to its closed portion. The holding of the thus-loaded article is maintained by the lock of the second locking mechanism.

In aspects of the present invention, detachment of the skis, or any other articles, can be performed by unlocking the second locking mechanism with the unlocking key to

allow the loading article-holding portion to be released, and releasing the loading article-holding portion.

In accordance with these aspects of the present invention, a plurality of first joining member and second joining member are joined one to another with a clearance therebetween in order to unite the periphery of the magnetic base portion with the periphery of the covering member. Therefore, no closed sectional structure is created either along the integrally-uniting portion around the central portion of the magnetic base portion and the covering member, or at the part of the covering member existing between the first integrally-uniting portion and the second integrally-uniting portion, or at the second integrally-uniting portion which is formed by the first joining member and the second joining member, and the part of the magnetic base portion existing between the second integrally-uniting portion and the first integrally-uniting portion. That is, the flexibility of the covering member can be retained, and further, the relative shift between the first joining member and the second joining member can be absorbed by the clearance. Accordingly, in a case where the periphery of the magnetic base portion is curved as it is used along the curvature of the roof to be brought into uniform contact therewith, the curvature is transferred from the catching portion of the first joining member to the interfering portion of the second joining member, and consequently the covering member arches following the curvature of the magnetic base portion due to its own flexibility. As a result, no clearance between the covering member and the magnetic base portion arises around the periphery. In other words, even when the curvature of the curved surface of the roof changes, i.e., depending upon the make or the model of automobiles, the roof carrier of various aspects of the invention can be mounted on the roof without exposing the peripheral portion of the magnetic base portion.

Loading articles which can be carried by the automobile roof carrier of aspects of the invention include skis and sticks, surfboards, snow-boards, mono-skis, wind-surfing boards and masts with sails, or any other long-sized articles, e.g., poles for sports equipment or for other objects.

(e) DESCRIPTION OF THE FIGURES

In the accompanying drawings:

Fig. 1 is a front view showing an example of a prior art automobile roof carrier;

5 Fig. 2 is a right side view of the automobile roof carrier of the prior art shown in Fig. 1;

Fig. 3 is a side view of the automobile roof carrier of the prior art shown in Fig. 1 while it is engaged;

Fig. 4 is a front view showing an embodiment of an aspect of an automobile roof carrier according to the present invention;

10 Fig. 5 is a top plan view showing the automobile roof carrier which is shown in Fig. 4;

Fig. 6 is a right side view showing the automobile roof carrier which is shown in Fig. 4;

Fig. 7 is an enlarged cross-sectional view taken along line 60-60 in Fig. 5;

15 Fig. 8 is an enlarged cross-sectional view taken along line 70-70 in Fig. 5;

Fig. 9A is an enlarged cross-sectional view taken along line 80-80 in Fig. 5;

Fig. 9B is an enlarged cross-sectional view showing a variation of the arrangement which is shown in Fig. 9A;

20 Fig. 10 is a top plan view showing a magnetic base portion of an embodiment of an aspect of an automobile roof carrier of the present invention;

Fig. 11 is an enlarged cross-sectional view taken along line 99-99 in Fig. 10;

Fig. 12A is an enlarged cross-sectional view taken along line 90-90 in Fig. 6;

Fig. 12B is an enlarged cross-sectional view showing a variation of the arrangement which is shown in Fig. 12A;

25 Fig. 13A is a top plan view showing the arrangement of Fig. 12A with an auxiliary cover removed;

Fig. 13B is an enlarged cross-sectional view showing a variation of the arrangement shown in Fig. 13A;

Fig. 14 is an enlarged cross-sectional view showing a loading article-holding portion of an embodiment of an aspect of an automobile roof carrier of the invention with the loading article-holding portion open;

5 Fig. 15 is an enlarged top plan view showing an example of a key which may be used with an embodiment of an aspect of an automobile roof carrier of the invention;

Fig. 16 is a partial cross-sectional view schematically-illustrating a joining structure between a magnetic portion and a covering member in an embodiment of an aspect of an automobile roof carrier of the invention;

10 Fig. 17 is a partial cross-sectional view schematically-illustrating a possible attracted state of a peripheral portion of an embodiment of an aspect of an automobile roof carrier of the invention;

Fig. 18 is a partial cross-sectional view showing another possible attracted state of a peripheral portion of an embodiment of an aspect of an automobile roof carrier of the invention;

15 Fig. 19 is a perspective view, partially in cross-section, showing essential components in the vicinity of a joining structure used in an embodiment of an aspect of the present invention;

20 Fig. 20 is a partial cross-sectional view showing an embodiment in an assembled state of a magnetic base portion and a covering member using a joining structure in an embodiment of an aspect of an automobile roof carrier of the invention;

Fig. 21 is a top plan view showing an example of a magnetic base portion which may be used in an embodiment of an aspect of an automobile roof carrier of the invention;

25 Fig. 22 is a partial cross-sectional view schematically-illustrating an exemplary attracted state of the periphery where a joining structure of an embodiment of an aspect of an automobile roof carrier of the invention is used;

Fig. 23 is a cross-sectional view showing a variation of an example of a first joining structure which may be used in an embodiment of an aspect of an automobile roof carrier of the invention;

Fig. 24 is a cross-sectional view showing another variation of an example of a first joining structure which may be used in an embodiment of an aspect of an automobile roof carrier of the invention; and

Fig. 25 is a cross-sectional view showing a variation of an example of a second joining structure which may be used in an embodiment of an aspect of an automobile roof carrier of the invention.

(f) DESCRIPTION OF THE PRIOR ART

Referring to Figs. 1 through 3, conventional ski carriers of the prior art include a magnetic base portion 1 that is attracted magnetically to a roof R of an automobile A. The magnetic base portion 1 is provided, at an appropriate location of the outer peripheral portion thereof, with a gripping portion 1A for removal thereof. A semi-cylindrical block 2 is integrally-joined on the top central portion of magnetic base portion 1 and is attached with a ski holder 5 in a rotatable up-and-down movable manner by means of a pair of right and left studs 4,4 that rotate forwardly and backwardly of the vehicle relative to semi-cylindrical block 2 on a rotating axis as the centre thereof from a lying position to an upright position. At the upright position of ski holder 5, a pair of skis 6 are fitted into a pair of fitting grooves 5A,5A which are formed side-by-side in ski holder 5. At this time, ski holder 5 drops down mainly due to the weight of a pair of skis 6 so that ski holder 5 is assured to be engaged at the upright position. Further, the engagement state can be released by lifting up ski holder 5 so that the ski holder 5 may be laid down.

In the prior art automobile roof-top ski carrier described above, attachment of a pair of skis 6 to ski holder 5 is performed by fitting a pair of skis 6 into a pair of fitting grooves 5A,5A and thereafter binding them with a rubber strap (not shown) in the usual appropriate manner. The rubber strap is untied when a pair of skis 6 are to be removed. Consequently, the operation of attachment and removal of the pair of skis 6 is complicated resulting in the difficulty of attachment and removal thereof. Besides, since a pair of skis 6 is fixed with a rubber strap, the fixing state can be released easily by a third person so that a pair of skis 6 are exposed to a danger of being stolen.

On the other hand, in a case where the ski carrier is not engaged, the ski carrier can be removed from roof R of automobile A by hooking ones fingers on hollowed gripping portion 1A for removal, to pull-up magnetic base portion 1. At this time, the base is being pulled-up so that the attracted area of magnetic base portion 1 of roof R is reduced gradually.

However, the prior art ski carrier can be easily-detached from roof R, since hollowed gripping portion 1A for removal is also exposed outside. Accordingly, the ski carrier itself is exposed to a danger of being stolen.

(f) AT LEAST ONE MODE FOR CARRYING OUT THE INVENTION

An embodiment of one aspect of the present invention will hereinafter be described with reference to the accompanying drawings.

Figs. 4, 5 and 6 are respectively front, top plan and right side views of an embodiment of an aspect of the present invention. Fig. 7 is an enlarged cross-sectional view taken along line 60-60 shown in Fig. 5. Fig. 8 is an enlarged cross-sectional view taken along line 70-70 shown in Fig. 5. Fig. 9A is an enlarged cross-sectional view taken along line 80-80 shown in Fig. 5. Fig. 9B is an enlarged cross-sectional view showing a variation of the arrangement shown in Fig. 9A. In Fig. 9A, a hollowed gripping portion 1A is constructed of a recessed or caverned structure, and a drawable and retractable handle-type gripping portion 1C is provided in the variation shown in Fig. 9B. In these drawings, the same reference numeral will be allotted to refer to identical or corresponding components with those in the above prior art example.

Referring to Figs. 4 through 8, an automobile roof carrier of that embodiment of an aspect of this invention includes a magnetic base portion 1 that is attracted magnetically to a roof R of an automobile A (see Fig. 3). The magnetic base portion 1 is provided, at an appropriate location of the outer peripheral portion thereof, with a hollowed gripping portion 1A for removal thereof. The portion of magnetic base portion 1, other than a magnetic attracted face 1B and hollowed-out gripping portion 1A for removal, is covered by a covering member 7 which is integrally-joined on the upper side of magnetic base portion 1. An auxiliary cover 8 that covers hollowed-out gripping portion 1A from the top side thereof is provided on the covering member 7 so as to be

opened and closed while a loading article-holding portion 9, that can be opened and closed, is integrally-joined onto the upper side of covering member 7.

As shown in Figs. 10 and 11, magnetic base portion 1 is constructed of a thin magnetic plate 1a and a metallic, thin, upper plate 1b which is integrally-bonded on the upper surface of the thin magnetic plate 1a. The integrated plate (namely, the metallic, thin, upper plate 1b) is formed in a substantially-square configuration with its four corners rounded. In the centre portion of magnetic base portion 1 four, flange-equipped, internally-threaded members 10,10..., are fixed in such a manner that each flange portion 10A is held between the thin magnetic plate 1a and the metallic, thin, upper plate 1b with its axial portion 10B being projected upwardly through a corresponding through hole 1b1 which is formed in metallic, thin, upper plate 1b. Further, metallic, thin, upper plate 1b is made to expand upwardly at one peripheral portion of magnetic base portion 1, while thin magnetic plate 1a for the corresponding portion is removed, so that a hollowed-out gripping portion 1A is formed.

As shown in Figs. 7,8,9A and 9B, covering member 7, which is made of a synthetic plastic resin, is formed by an inverted, tray-shaped structure having a size that allows the portion of magnetic base portion 1, other than magnetic attracted face 1B, to be covered relatively closely. In the central portion of covering member 7, a mounting portion 7A is formed so as to be projected upwardly in order to mount loading article-holding portion 9. In addition, two, flange-equipped, internally-threaded members 11,11, each composed of a flange portion 11A and an axial portion 11B, are fit upwardly in corresponding through holes 7a which are formed in mounting portion 7A. Flange portions 11A abut against the lower face of mounting portion 7A, while each top end of the axial portions 11B reaches the upper boundary level of through hole 7a. The covering member 7 further includes four holding cylinders 7B,7B..., which are formed vertically. Each holding cylinder 7B holds an externally-threaded member 18 (therefore, there are in total four, externally-threaded members 18,18..., which are shown in Fig. 7), which is screwed in the vicinity of the corresponding flange-equipped, internally-threaded member 11 into the corresponding flange-equipped, internally-threaded member 10 on magnetic base portion 1. An auxiliary cover 8 is attached to a corresponding

position of hollowed-out gripping portion 1A, or to a drawable and retractable handle-type gripping portion 1C in magnetic base portion 1, so as to be able to open and close the auxiliary cover 8.

As is apparent from Fig. 5, the aforementioned auxiliary cover 8 is rotatably-attached at a proximal end 8A thereof to covering member 7, so that it can rotate in a vertical direction by means of pins 12,12. As is shown in Fig. 6, the cover is formed at a distal end 8B with a first key insertion hole 13, and is provided with a hook 14 projecting horizontally-inwardly inside the distal end 8B. The closed state of auxiliary cover 8 is adapted to be clutched or locked by a first locking mechanism 15.

First locking mechanism 15, as is shown in Fig. 12A and Fig. 12B, and in Fig. 13A and Fig. 13B, is provided so as to be able to shift in the directions of arrows w1 and w2 over the portion of covering member 7 to be covered when auxiliary cover 8 is closed. The first locking mechanism 15 is composed of a latch 15A that is maintained at a locking position, shown by a solid line under the pressure of an elastic member (not shown), and the aforementioned hook 14 that will engage a bevel 15a which is formed on the upper side of an operative end of latch 15A.

Among the structures described heretofore, Fig. 12B and Fig. 13B show a variation of Fig. 12A and Fig. 13A. The main difference in the embodiment of an aspect of the invention which is shown by Fig. 12B and Fig. 13B from that which is shown as Fig. 12A and Fig. 13A is that the embodiments of an aspect of the invention which are shown in Fig. 12A and Fig. 13A are provided with a hollowed-out gripping portion 1A, whereas the embodiments of an aspect of the invention which are shown in Fig. 12B and Fig. 13B are provided with a drawable and retractable, handle-type portion 1C. This drawable and retractable, handle-type portion 1C is rotatably-held at both side ends by axial end supporting portions 1D,1D as shown in Fig. 13B. When auxiliary cover 8 is closed, the handle is laid down or retracted inside auxiliary cover 8. When auxiliary cover 8 is unlocked to be opened, a drawable and retractable handle-type portion 1C is brought to an upright position as indicated by broken lines in Fig. 12B. In this state, an operator can grip the drawable and retractable handle-type portion 1C by his/her hand and may easily draw up the magnetic base portion 1 in the direction of arrow P to detach

it from the roof. Further, in the embodiments of an aspect of the invention which are depicted in Fig. 9A, 12A and 13A, since the hollowed-out gripping portion 1A is formed by a hollow structure to expand out upwardly, the auxiliary cover 8 must be formed with a bulge to cover the hollowed-out gripping portion 1A. In contrast to this, in the
5 embodiments of an aspect of the invention which are shown in Fig. 9B, Fig. 12B and Fig. 13B, since the drawable and retractable, handle-type gripping portion 1C can be accommodated inside auxiliary cover 8 as the handle is laid down when it is not in use, the surface of auxiliary cover 8 can be generally level with that of the other part of covering member 7 without steps as shown in the above-mentioned figures. Accordingly,
10 the structure serves to reduce wind resistance, as well as it is preferable in view of the outer appearance of the carrier.

A loading article-holding portion 9 comprises a fixed member 9A which is located at its lower side, and a movable member 9B which is located at its upper side, as shown in Fig. 4 through Fig. 8. The proximal end portions of fixed member 9A and movable
15 member 9B are hinged to each other through a horizontally-extended pin 9C. A second locking mechanism 16 is provided for the respective distal end portions of fixed member 9A and movable member 9B to lock them one to another, thus maintaining the closed position. On both sides in the centre portion of fixed member 9A, a pair of bottom holding cylinders 9A1,9A1 are formed vertically, which hold respective externally-
20 threaded members 19,19 that, in turn, are screwed into corresponding flange-equipped, internally-threaded members 11,11 on covering member 7. A second key insertion hole 17 is formed on the distal end side of fixed member 9A. A lower side pad 20, which is formed of an elastic material, is attached onto the upper face of fixed member 9A. An upper side pad 21, which is also formed of elastic material, is attached onto the lower
25 face of movable member 9B.

As is apparent from Fig. 7, the second locking mechanism 16 comprises a lever-like latch 16B which is rotatably-attached to fixed member 9A. It is maintained at a locking position, as shown by solid line, by the pressure of a spring 16A and a hook 16C, which are disposed in movable member 9B in correspondence with arc surface 16b

which is formed at an upper, operative end of lever-like latch 16B. The second key insertion hole 17 is formed near the force point side of lever-like latch 16B.

The joint between magnetic base portion 1 and covering member 7 is arranged, as shown in Fig. 7, by placing covering member 7 over magnetic base portion 1 while four, externally-threaded members 18,18..., are screwed into respective internally-threaded members 10,10.... More specifically, each upper end portion of axial portion 10B of flange-equipped, internally-threaded member 10, which is disposed on magnetic base portion 1 (there are four, internally-threaded members 10,10..., but only two internally-threaded members 10,10 are shown in Fig. 7), is to fit into a respective holding cylinder 7B. The thus-fit flange-equipped, internally-threaded members 10,10..., are engaged by internally-threaded members 18,18.... In this manner, magnetic base portion 1 is covered by covering member 7 except at the magnetic attracted face 1B and the hollowed gripping portion 1A.

In uniting covering member 7 with loading article-holding member 9, while movable member 9B is opened (see Fig. 14), fixed member 9A of loading article-holding member 9 is mounted on mounting portion 7A so that the pair of bottom holding cylinders 9A1,9A1..., meet the flange-equipped, internally-threaded members 11,11. Then, externally-threaded members 19,19 are screwed into respective flange-equipped, internally-threaded members 11,11 to complete the joint.

Fig. 15 shows a key (card key) 22, which may be made of any material, e.g., synthetic plastic resins or metals, as long as the material has an appropriate strength and formability. This key is used for unlocking both the first locking mechanism 15 and the second locking mechanism 16.

A pair of the thus-constructed automobile roof carriers is attached magnetically onto roof R of automobile A in the same manner as in the prior art product in Fig. 3, one in the front and the other in the rear side with a predetermined interval therebetween.

The following description is for the case where a loading article, e.g., skis and the like (not shown) are held between loading article-holding portion of the automobile roof carrier attached on roof R.

First of all, key (card key 22) shown in Fig. 15 is inserted into second key-insertion hole 17 which is formed in fixed member 9A of loading article-holding portion 9 shown in Fig. 7. With the insertion of key 22, the front end of key 22 presses the force point side of the lever-like latch 16B against the pressure of spring 16A. This causes latch 16B to rotate clockwise and disengage from hook 16C of movable member 9B so as to be unlocked. After the unlocking, movable member 9B is rotated on pin 9C as a rotational centre from the closed position to the opened position so that movable member 9B is freed as shown in Fig. 14. Needless to say, it is possible to provide a spring (not shown) which may be used to rotate movable member 9B to be opened automatically when the lock is unlocked. Then, the loading article, e.g., skis, is set on lower side pad 20 and thereafter movable member 9B is rotated toward the closing position. Just before movable member 9B reaches the rotational end in the closing direction, or just before movable member 9B arrives at a locking position of second locking mechanism 16, hook 16C in Fig. 7 interferes in a sliding contact with arc surface 16B which is formed in the upper operative end portion of latch 16B. By such interference, latch 16B is slightly rotated clockwise against the pressure of spring 16A. At the end of sliding between hook 16C and arc surface 16b, latch 16B returns to the locking position by the pressure of spring 16A. As a result, latch 16B becomes engaged at its lower face of the upper operative end portion with hook 16C to create a locking state. In the locking state, the loading articles can be held securely between fixed member 9A and movable member 9B through lower pad 20 and upper pad 21, respectively. That is, attachment of loading articles can be carried out by a simple "single touch" operation of releasing loading article-holding portion 9, setting loading articles, e.g., skis, on the released loading article-holding portion 9 and rotating loading article-holding portion 9 to the closing position. The holding state can be maintained securely by the engagement of second locking mechanism 16.

The following description is for the case where loading article, e.g., skis and the like, which are in loading article-holding portion 9, is removed therefrom.

Initially, key 22 is used to unlock in the same manner as in the aforementioned unlocking operation. Then, a simple rotation of movable member 9B from the closed

position toward the opening position allows the article to be released. That is, the attachment and removal of the loading articles can be simplified, and consequently it is possible greatly to improve the ease of attachment and removal. Further, unless key 22 is used to unlock second locking mechanism 16, the loaded articles cannot be removed from loading article-holding portion 9. Therefore, a reliable protection against theft can be provided to improve the security.

In accordance with another embodiment of an aspect of the present invention, the roof carrier is attached to roof R of automobile A utilizing magnetic attraction of magnetic base portion 1. In this case, gripping portion 1A for removal thereof in magnetic base portion 1 is hidden by auxiliary cover 8, and the hidden state can be maintained using the first locking mechanism 15. In other words, unless first locking mechanism 15 is unlocked to open auxiliary cover 8 and thereby exposing gripping portion 1A for removal, it is impossible to remove the roof carrier from roof R. Accordingly, it is possible reliably to prevent the theft of the roof carrier to achieve an increased safety.

When the roof carrier is not used, the carrier can be removed from roof R of automobile A. In this operation, key 22 is inserted into the first key insertion hole 13 as shown in Fig. 6, Figs. 12A and 12B and Figs. 13A and 13B, so that the front end of key 22 presses latch 15A of the first locking mechanism 15 against the pressure of a spring (not shown). This shift of latch 15A in the direction of arrow w1 disengages the interlock between the operative end portion of latch 15A and hook 14 which is formed integrally with auxiliary cover 8 so as to unlock the engagement. After the release, auxiliary cover 8 is rotated on pins 12, 12 as a rotation centre from the closed position to the opened position so that gripping portion 1A or 1C for removal thereof can be exposed. It is also possible to provide a spring (not shown) which allows auxiliary cover 8 to be opened automatically when the lock is released. When gripping portion 1A or 1C for removal thereof has been exposed, an operator can grip and pull up the gripping portion 1A or 1C by his/her fingers. Continuing the pulling-up operation, the attached area of magnetic base portion 1 to roof R can be reduced gradually to detach the carrier from roof R.

On the other hand, opened auxiliary cover 8 may be rotated toward the closing position. In this closing, just before auxiliary cover 8 reaches rotational end in the closing direction, or just before first locking mechanism 15 completes the locking engagement, hook 14 in Fig. 12A or 12B interferes in a sliding contact with bevel 15a which is formed on the upper side of an operative end of latch 15A. By the interference, latch 15A is slightly displaced in a direction of arrow w1 against the pressure of a hook 14C and bevel 15a, latch 15A returns to the locking position by the pressure of the spring. As a result, latch 15A is engaged with hook 14 to assure the locking state.

Although the above description of the embodiment of an aspect of the invention has been made as to the attachment of the skis to loading article-holding portion 9, other elongated articles, e.g., surfboards, long size poles and the like, may be held as mentioned above.

As has been described heretofore, in accordance with embodiments of the aspects of the present invention, the attachment of loading articles to the roof carrier can be carried out by a simple "single touch" operation of releasing loading article-holding portion, setting loading articles, e.g., skis on the released loading article-holding portion and rotating the loading article-holding portion to the closing position. On the other hand, removal of loaded articles can be carried out simply by allowing the release of the loading article-holding portion by unlocking the second locking mechanism with the unlocking key so that the loading article-holding portion may be opened. Thus, the operation and handling can be simplified, so that the operation of the attachment and removal of loading articles can be greatly improved.

Further, the gripping portion for removal thereof is hidden by the auxiliary cover, and the hidden state can be locked and maintained using the first locking mechanism. Therefore, it is possible reliably to prevent the roof carrier from being stolen and thereby to achieve improved safety. Moreover, since the holding state for the loaded articles which are held by the loading article-holding portion can be maintained by the second locking mechanism, it is possible reliably to prevent the loaded articles from being stolen and thereby to achieve improved safety.

The roof carrier of this type has an integrated structure in which magnetic base portion 1 and covering member 7 are joined only with joints at or around the central portion thereof as described above. That is, in the integrated structure in which magnetic base portion 1 and covering member 7 are joined with a plurality of external threads 18 (only one thread 18 being shown in Fig. 16) around the central portion thereof, magnetic base portion 1, curving along the curved surface of roof R, comes into uniform contact therewith. Nevertheless, the curvature of magnetic base portion 1 cannot be carried over to the peripheral side of covering member 7. Therefore, the covering member 7 retains its original form, so that clearance 41 in the periphery between covering member 7 and magnetic base portion 1 might occur. Consequently, the roof carrier is mounted on roof R while the peripheral part of magnetic base portion 1 remains exposed outside.

This exposure not only detracts from the appearance of the roof carrier when it is used, but also increases the air resistance while driving. Further, there might be a possibility of reduction of the magnetic attractive force in magnetic base portion 1 of the roof carrier. The air flow over covering member 7 creates a negative pressure, and an air pressure is increased by the air that flows into clearance 41 toward the lower face of covering member 7. As a result, a lift will be created by such combination of forces. The combined lifting force of the negative pressure and the air pressure might weaken the magnetic attractive force of magnetic base portion 1.

In order to minimize the occurrence of such inconvenience, a structure according to another embodiment of an aspect of this invention can be considered in which, as shown in Fig. 18, magnetic base portion 1 and covering member 7 are joined integrally by uniting therebetween at their peripheries using a plurality of external threads 42 (only one thread 42 being shown in Fig. 18) as well as providing the central portion with a plurality of external threads 18 (only one thread 18 being shown in Fig. 18).

In the thus-constructed joining structure, a closed cross-sectional structure will be formed by the uniting joint portion XI which is formed by a plurality of external threads 18, the uniting joint portion X2 which is formed by a plurality of external threads 42, covering member 7X existing between uniting joint portions X1 and X2 and magnetic base portion 1X existing between uniting joint portions X1 and X2. Therefore, the

rigidity of the section is greatly increased. As a result, even if magnetic base portion 1X tends to be curved in order to bring the base portion into uniform contact with the curvature of roof R of automobile A as shown by an imaginary line, the closed sectional structure having high rigidity substantially prevents deformation or curving of magnetic base portion 1 and covering member 7. Consequently, the contact area to roof R might be reduced greatly. Accordingly, magnetic attraction force which is exerted by magnetic base portion 1 might be weakened due to the air resistance as the automobile drives.

To deal with this, another embodiment of an aspect of the present invention also proposes means for inhibiting such inconvenience. Fig. 19 is a perspective, exposed view partially showing elemental components of another embodiment of an aspect of the present invention. Fig. 20 is a partial sectional showing its assembled state. Here, identical or corresponding parts with those in the aforementioned Figs. 4 through 20 or Figs. 1 through 3 will be allotted by the same reference numerals and the detailed description will be omitted.

Referring to Fig. 19 and Fig. 20, a first joining member 43 is securely fixed by spot-welding on an upper side of the periphery of magnetic base portion. The first joining member 43 has a catching portion 43A that faces to, and is spaced by, a distance "h" from the upper surface of magnetic base portion 1. The catching portion 43A is formed by a fork, having branches which are oriented to a periphery 1a of magnetic base portion 1 with a cutout portion 44 therebetween and extending parallel to magnetic base portion 1. As shown in Fig. 21, five pieces of first joining members 43 are provided on the upper surface in the periphery of magnetic base portion 1.

A boss element 45 is projected downwardly from the upper surface of covering member 7, corresponding to cutout portion 44 of each catching portion 43A, as shown in Fig. 19 and Fig. 20. A screw bolt 46 is fit into the internal thread portion of boss element 45. The combination of boss element 45 and screw bolt 46 constitutes a second joining member 47. The outer diameter D1 of boss element 45 is set slightly smaller than the width W of cutout portion 44. Therefore, a clearance 48 is formed between the inside periphery of cutout portion 44 which is formed in catching portion 43A of first joining member 43 and the outside periphery of boss element 45. The outer diameter D2

of the head 46A of screw 46 is made larger than the outer diameter D1 of boss element 45 so as to provide the function as an interfering portion.

Accordingly, in assembling magnetic base portion 1 with covering member 7, first, as shown in Fig. 19, the opening in cutout portion 44 of catching portion 43A is made to meet with boss element 45, and thereafter magnetic base portion 1 and covering member 7 are shifted relatively in respective directions shown by the arrows. After boss element 45 is positioned in cutout portion 44 of catching portion 43A, as shown in Fig. 20, a plurality of external thread screws 18 (only one external thread screw 18 being depicted in Fig. 20) are fixed around the central portion of magnetic base portion 1 and covering member 7 in order to form these items into one body structure. By this operation, clearance 48 extending in a semicircular range is formed between the inside periphery of cutout portion 44 and the outside periphery of boss element 45.

In the joining structure of this embodiment of an aspect of the invention, magnetic base portion 1 and covering member 7 are coupled one to another at their peripheries by the combination of first joining member 47 while clearance 48 is provided between the two members. More specifically, clearance 48 is formed extending across a semicircular range between the inside periphery of cutout portion 44 which is formed in catching portion 43A of first joining member 43 and the outside periphery of boss element 45. Therefore, no closed sectional structure is created along integrally-uniting portion X1 around the central portion of magnetic base portion 1 and covering member 7, the part of covering member 7X existing between first integrally uniting portion X1 and second integrally uniting portion X2, second integrally uniting portion X2 formed by first joining member 43 and second joining member 47 and the part of magnetic base portion 1 existing between second integrally uniting portion X2 and first integrally uniting portion X1. As a result, the flexibility of covering member 7 can be maintained, and further, the relative shift between first joining member 43 and second joining member 47 can be absorbed by clearance 48.

As shown in Fig. 22, when the carrier of this embodiment of an aspect of this invention is used, the periphery of magnetic base portion 1 is curved along the curvature of roof R to be brought into uniform contact therewith. In this case, the curvature is

transferred from the catching portion of first joining member 43 to an interfering portion of the second joining member 47, or a head 46A of screw 46, and consequently the peripheral side of covering member 7 is pulled down. Covering member 7 itself has its own flexibility so that it may arch following the curvature of magnetic base portion 1. As a result, no clearance 41 occurs (see Fig. 17) which would have arisen between covering member 7 and magnetic base portion 1 around their peripheries. In other words, even when the curvature of curved surface of roof R may change depending upon the make or the model of the automobile, the roof carrier of an embodiment of an aspect of the invention can be mounted on the roof without exposing the periphery of magnetic base portion 1.

Accordingly, the appearance of the roof carrier of this embodiment of an aspect of this invention is not detracted when it is used. No incremental increase in air resistance occurs when the automobile is driven. Moreover, the roof carrier is never influenced or disturbed by the combined lifting force, that is, the negative pressure that would be created by the air flow over covering member 7 and the air pressure that would be increased by the air that flows into clearance 41 toward the lower face of covering member 7. Needless to say, no disturbance in the bending of magnetic base portion 1 and covering member 7 occurs. This means that no contact area with roof R would be reduced significantly.

Thus, the roof carrier according to an embodiment of an aspect of the present invention is improved in security and can prevent the loaded articles and the roof carrier itself from being stolen while its appearance is not detracted when it is used. Further, neither is there an incremental increase of the air flow resistance during driving nor is there a reduction of contact area with the roof. Accordingly, the roof carrier of this embodiment of an aspect of this invention can be mounted in conformity with any variation in curvature of curved surfaces of roof R.

In the above embodiment of an aspect of this invention, although the description has been made with respect to the configuration in which first joining member 43 having catching portion 43A is formed of a fork with cutout portion 44 and second joining member 47 is formed of boss element 45 and screw bolt 46 fit into boss element 45, it

is also possible to construct a second joining member 47 by insert-forming a bolt 46 into boss element 45. On the other hand, catching portion 43A which is made in the shape of a fork may be formed by cutting and press-forming as shown in Fig. 23. Further, as shown in Fig. 24, a catching portion 43A of first joining member 43 may be constructed with a cutout 44 of a circular through-hole. In this case, in order to couple first joining member 43 with second joining member 47, a manual tool inserting hole 49 for introducing bolt 46 and screw driver should be formed at a position corresponding to circular cutout portion 44. Alternatively, as shown in Fig. 25, projecting downwardly from the lower face of covering member 7, boss element 45 and interfering portion 46A may be integrally-formed to construct second joining member 47, so that the thus-formed second joining member 47 is coupled with first joining member 43 having catching portion 43A of the form with cutout portion 44.

Although, in the above description of the embodiments of aspects of this invention, skis have been used as a typical example of the article to be loaded on loading article-holding portion 9, it should be understood that surfboards, long size poles, or any other elongated articles can be held.

As described heretofore, the roof carrier according to embodiments of aspects of the present invention is improved in security and can prevent the loaded articles and the roof carrier itself from being stolen, and yet the appearance is not degraded when it is used. Further, an incremental increase of the air flow resistance at driving and reduction of contact area with the roof is prevented so that the roof carrier can be mounted in fit with curvature of any curved roof surface.

CLAIMS:

1. An automobile roof carrier comprising:
 - a magnetic base portion, which is magnetically-attracted onto an upper surface of a roof of an automobile;
 - a gripping portion for removal thereof, said gripping portion being formed at an outer peripheral position of said magnetic base portion;
 - a covering member, which is disposed over said magnetic base portion and which is integrally-united therewith so as to cover the portion thereof other than the attracted surface of said magnetic base portion and said gripping portion for removal thereof;
 - a loading article-holding portion, which is disposed above said covering member, and which is integrally-joined thereto, and having means to be opened and closed to hold articles;
 - an auxiliary cover which is attached to said covering member so as to be opened and closed to provide a lid over said gripping portion for removal from the top;
 - a first locking mechanism which is disposed in said auxiliary cover to be locked for maintaining said auxiliary cover in its closed state when said auxiliary cover is closed;
 - a second locking mechanism which is disposed in said loading article-holding portion to be locked for maintaining said loading article-holding portion in its closed state when said loading article-holding portion is closed; and
 - a common key for unlocking said first locking mechanism and said second locking mechanism.
2. An automobile roof carrier comprising:
 - a magnetic base portion, which is magnetically-attracted onto an upper surface of a roof of an automobile;
 - a gripping portion for removal thereof, said gripping portion being formed at an outer peripheral position of said magnetic base portion;
 - a covering member, which is disposed over said magnetic base portion and which is integrally-united therewith so as to cover the portion thereof other than said attracted surface of said magnetic base portion and said gripping portion for removal thereof;

a loading article-holding portion, which is disposed above said covering member, and which is integrally-joined thereto and having means to be opened and closed to hold articles;

an auxiliary cover which is attached to said covering member so as to be opened and closed to provide a lid over said gripping portion for removal from said top;

a first locking mechanism which is disposed in said auxiliary cover to be locked for maintaining said auxiliary cover in its closed state when said auxiliary cover is closed;

a second locking mechanism which is disposed in said loading article-holding portion to be locked for maintaining said loading article-holding portion in its closed state when said loading article-holding portion is closed;

a common key for unlocking said first locking mechanism and said second locking mechanism;

a plurality of first joining members, each of said first joining members having catching means which are formed with a cutout portion, and which are disposed in appropriate, peripheral positions on said magnetic base portion; and

a plurality of second joining members, which are disposed on the undersurface of said covering member in positions corresponding to said respective first joining members, and extending downwardly, each of said second joining members being constructed of a boss element and an interfering element which is attached to the lower end of said boss element;

wherein said corresponding pairs of first and second joining members are engaged such that said boss portions when said magnetic base portion and said covering member are united integrally, and in, each pair of said joining members, a clearance in a radial direction of said boss element between the inside edge of said cutout portion and the outside edge of said boss element is created across at least semicircular range.

3. The automobile roof carrier according to any one of claims 1 and 2, wherein said loading article is skis.

FIG. 1 PRIOR ART

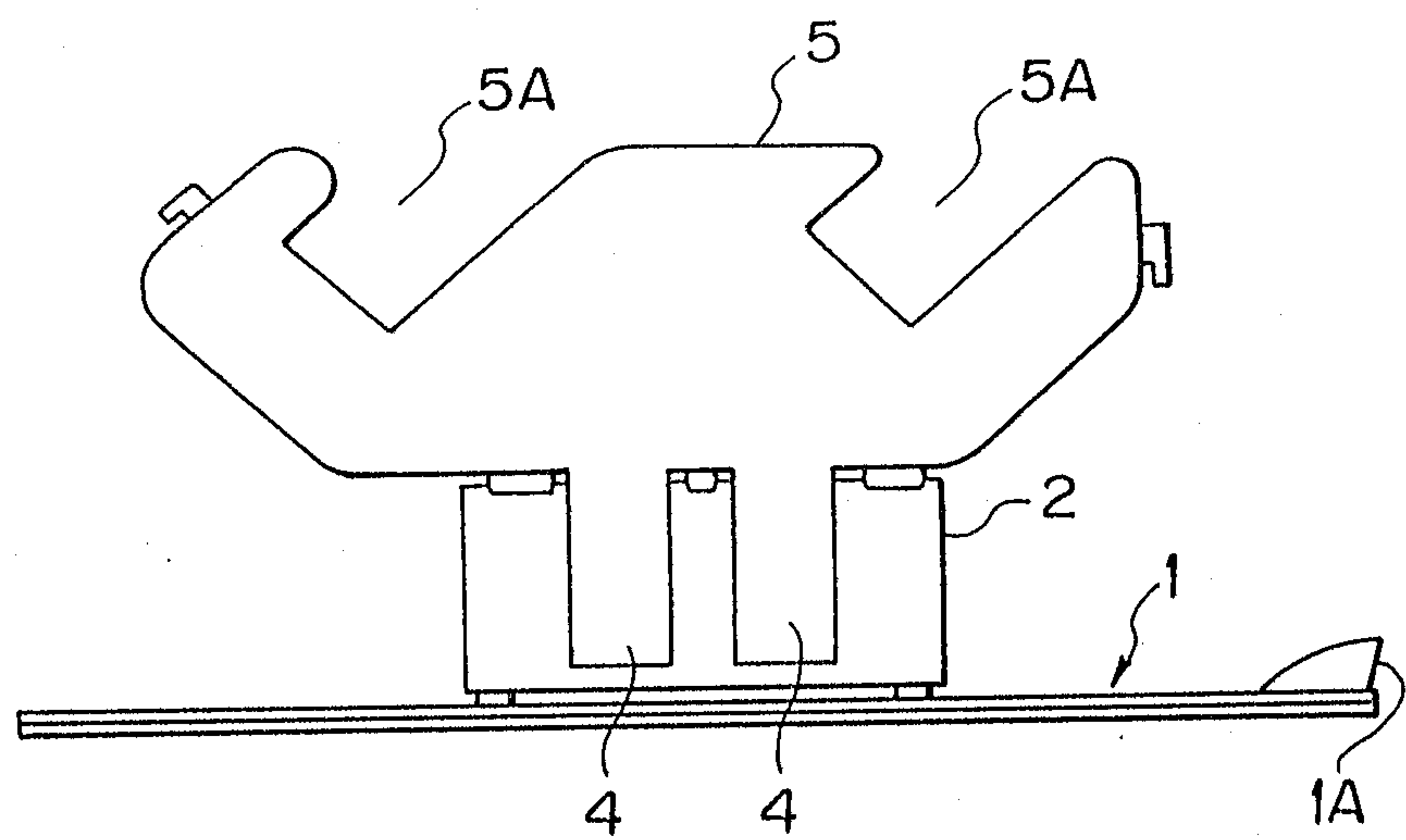


FIG. 2 PRIOR ART

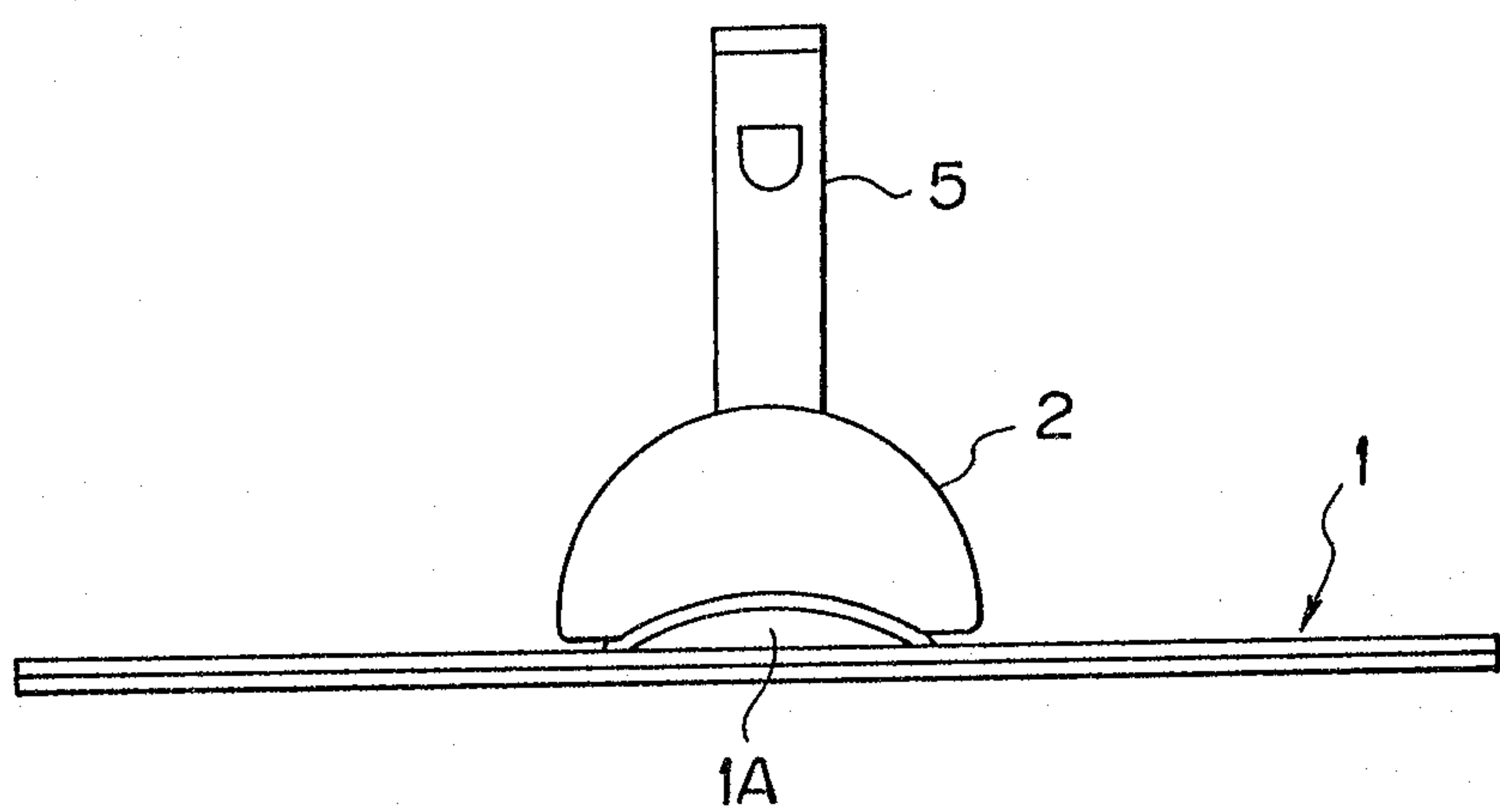


FIG. 3 PRIOR ART

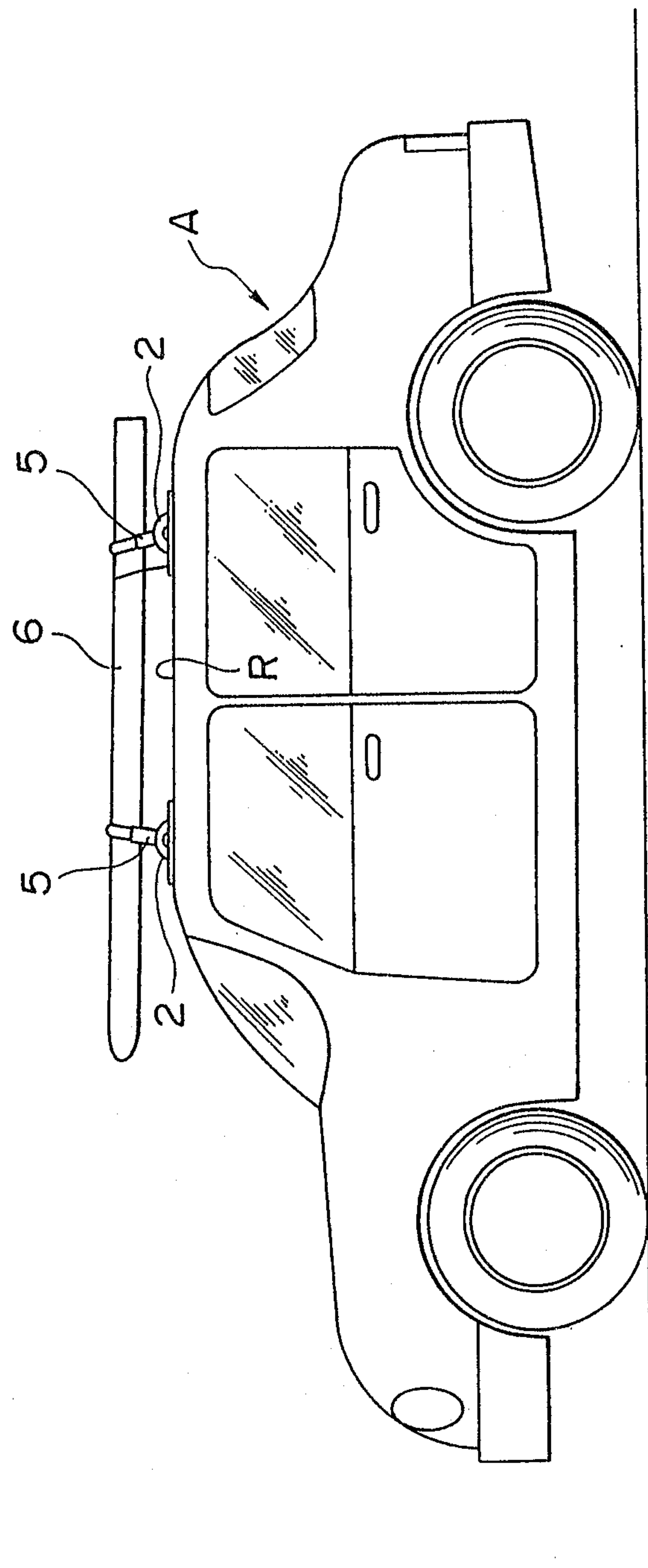


FIG. 4

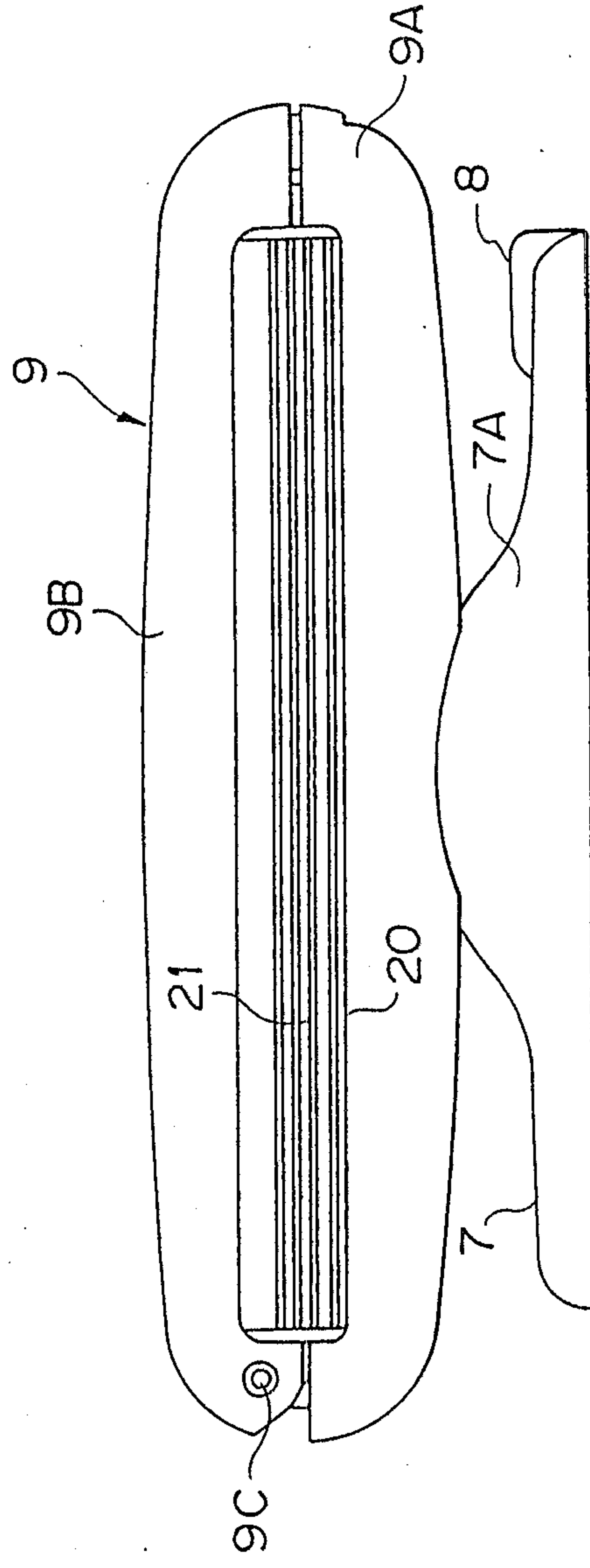
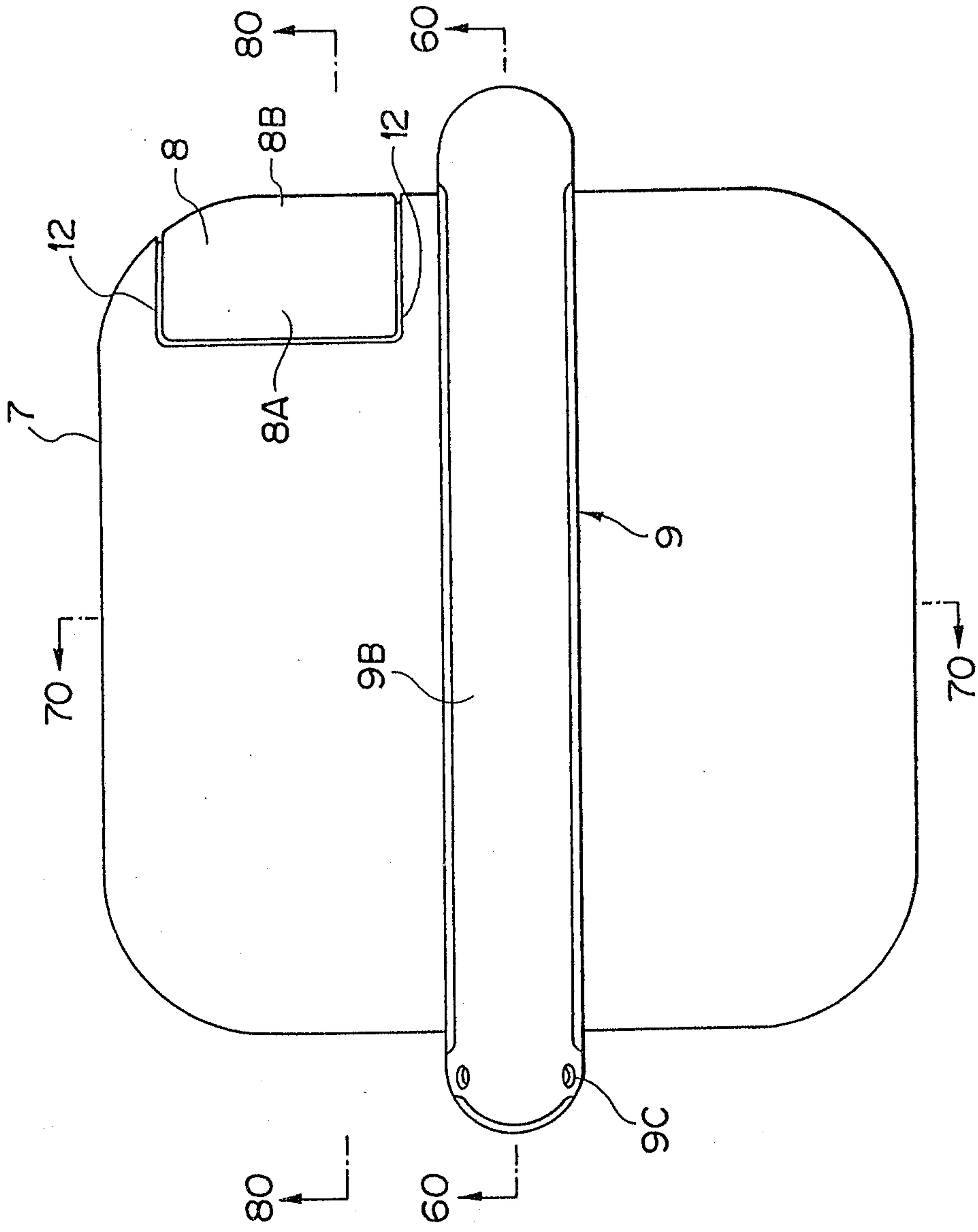


FIG. 5



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FIG. 6

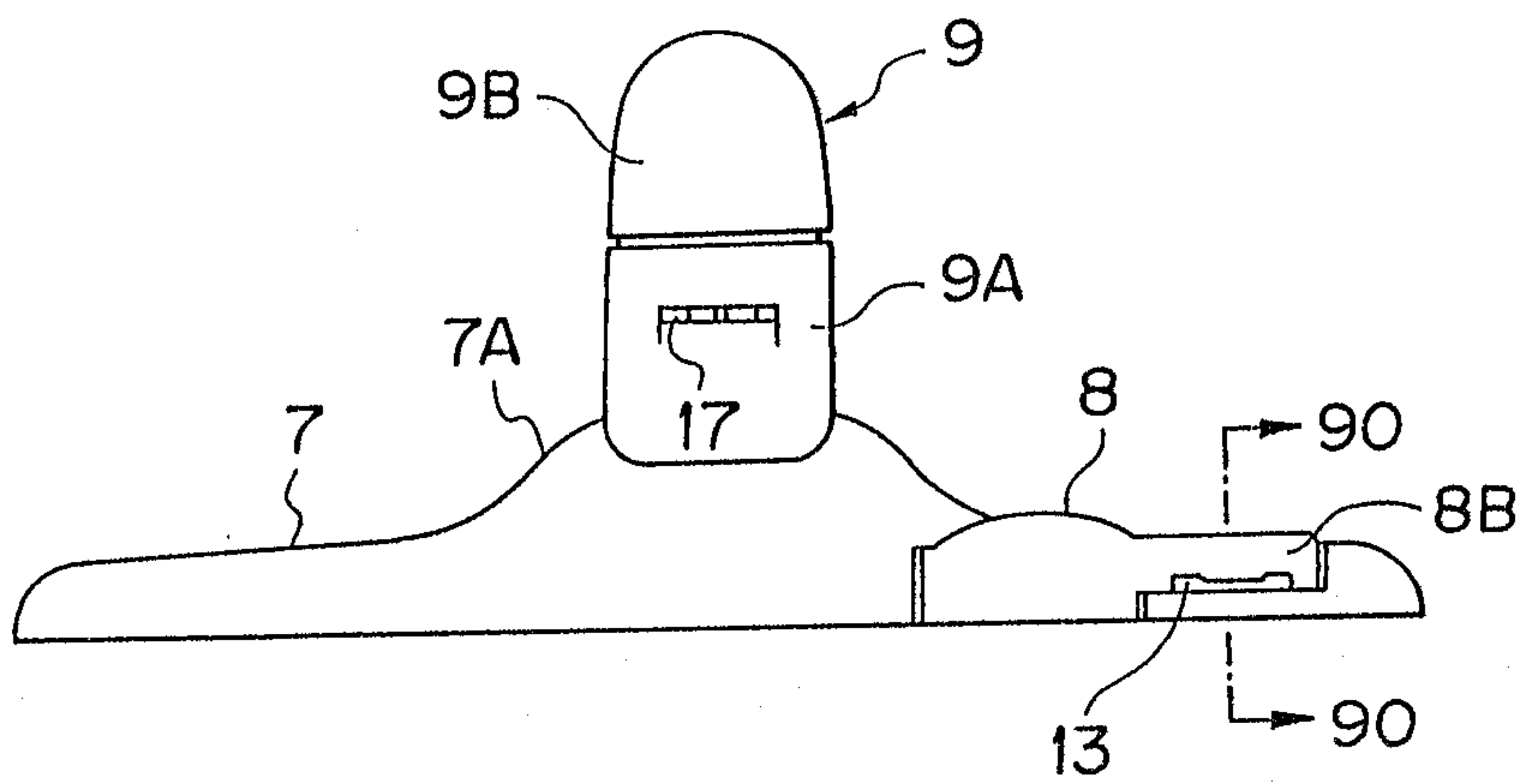


FIG. 7

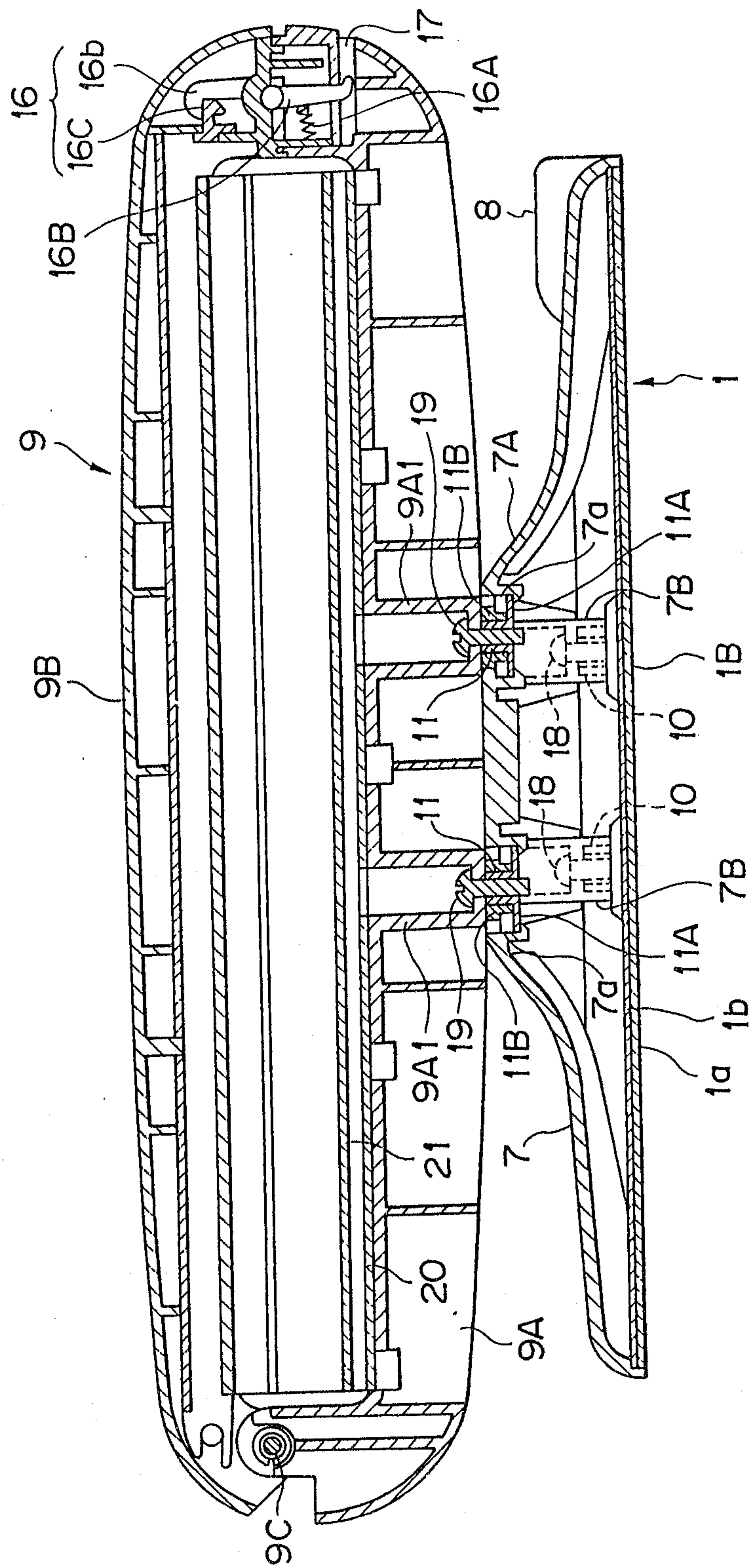


FIG. 8

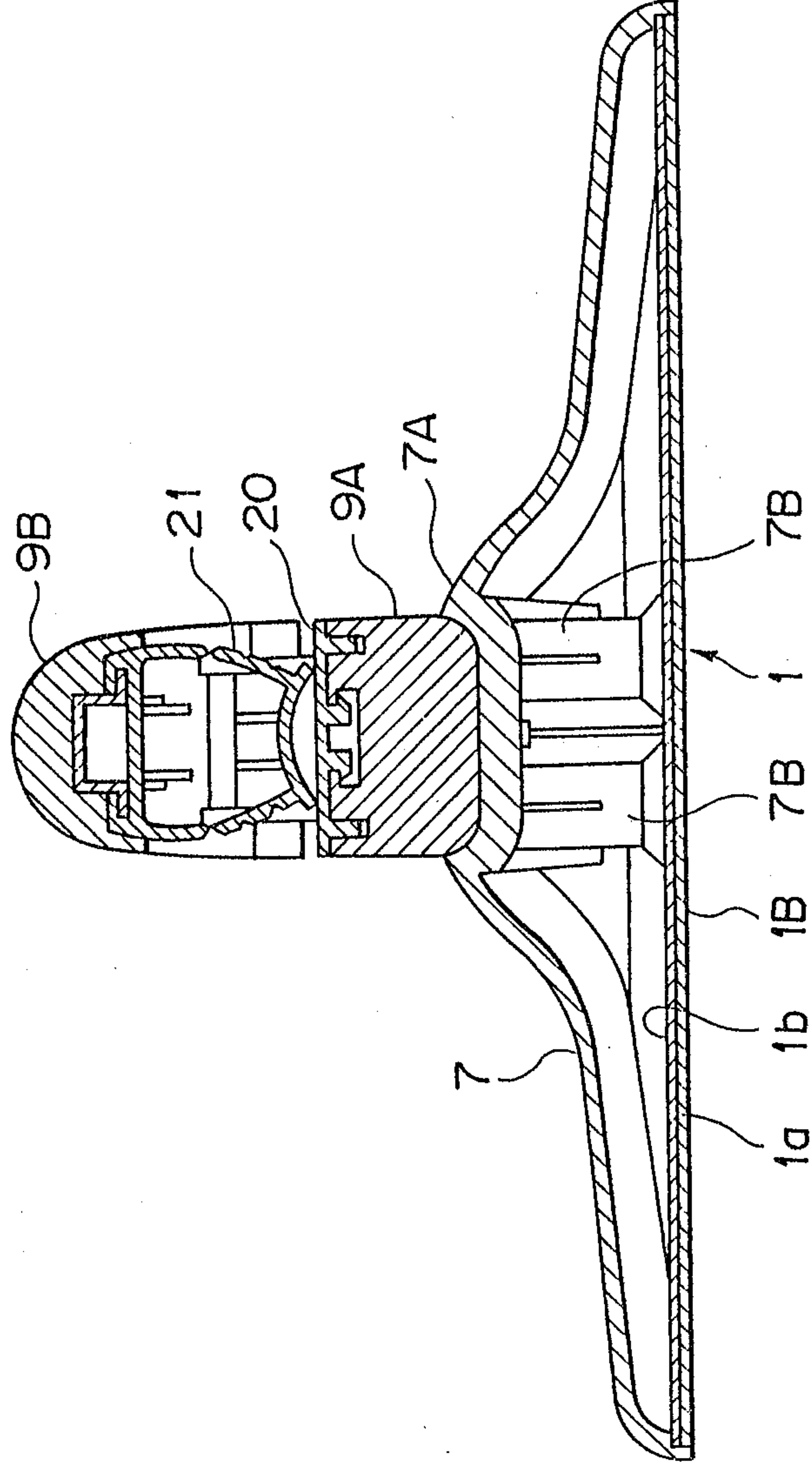


FIG. 9A

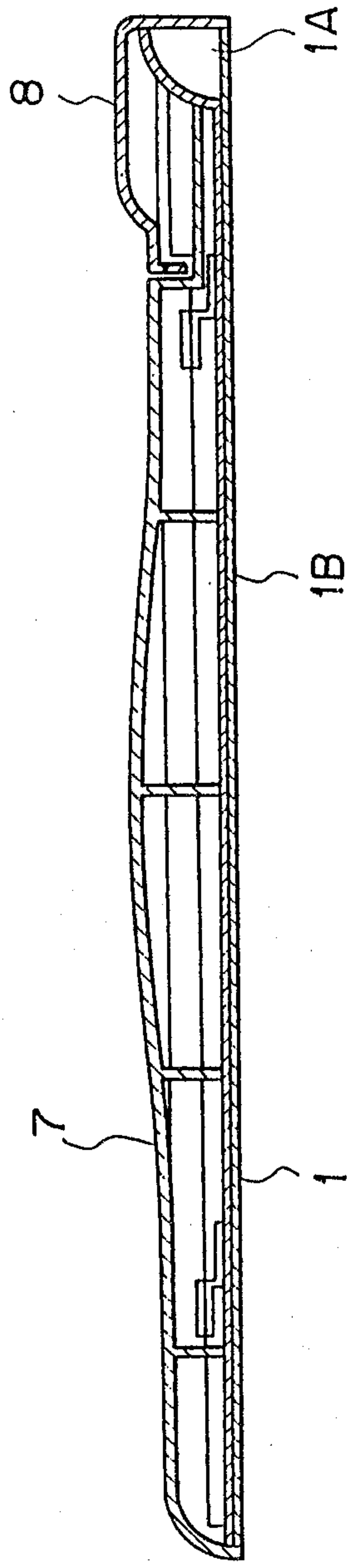
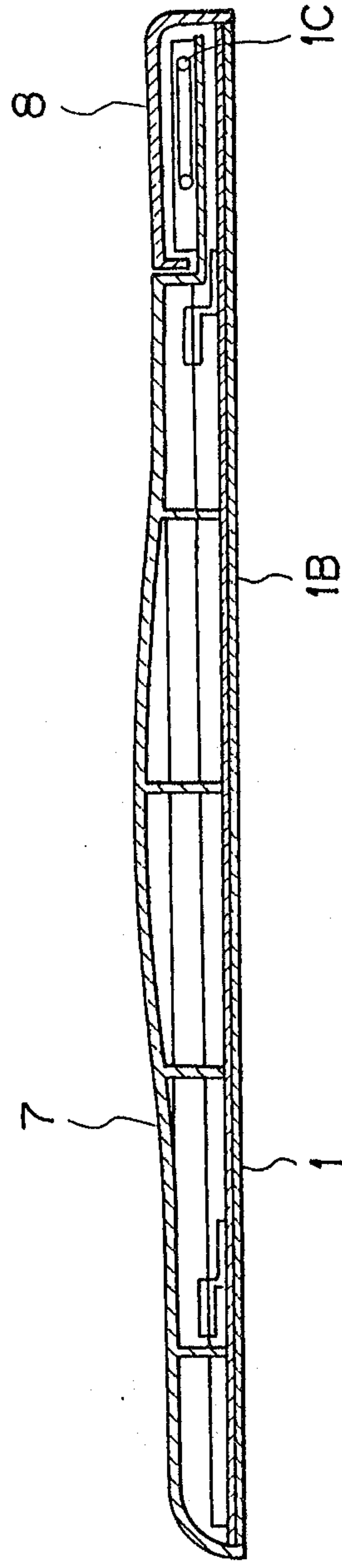


FIG. 9B



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FIG. 10

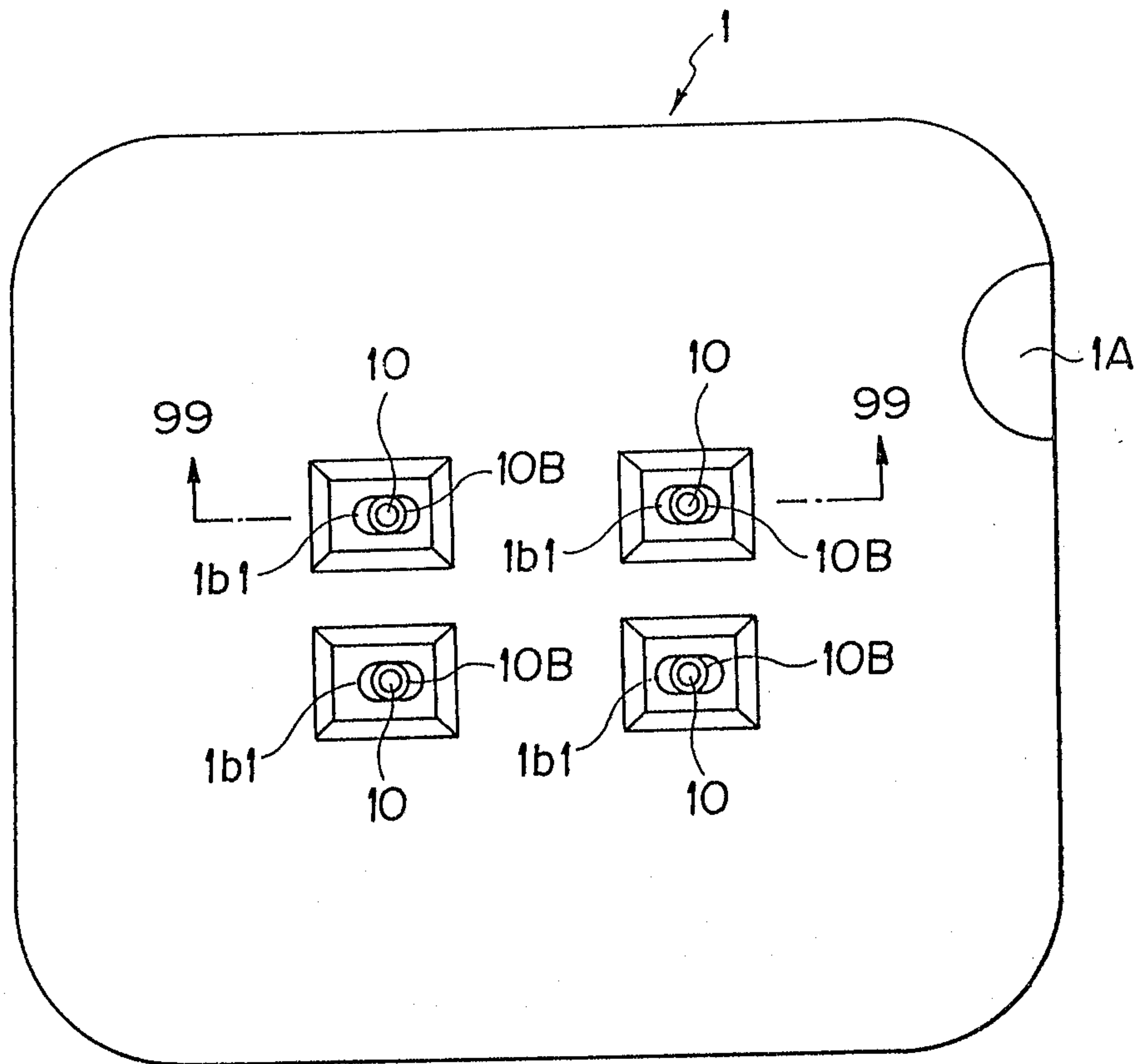


FIG. 11

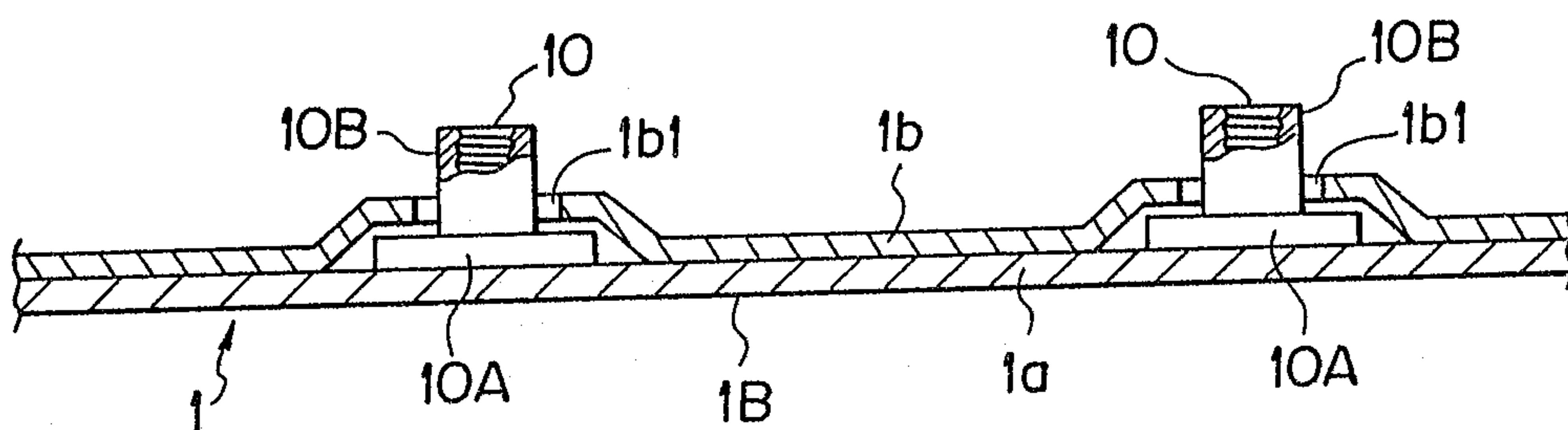


FIG. 12A

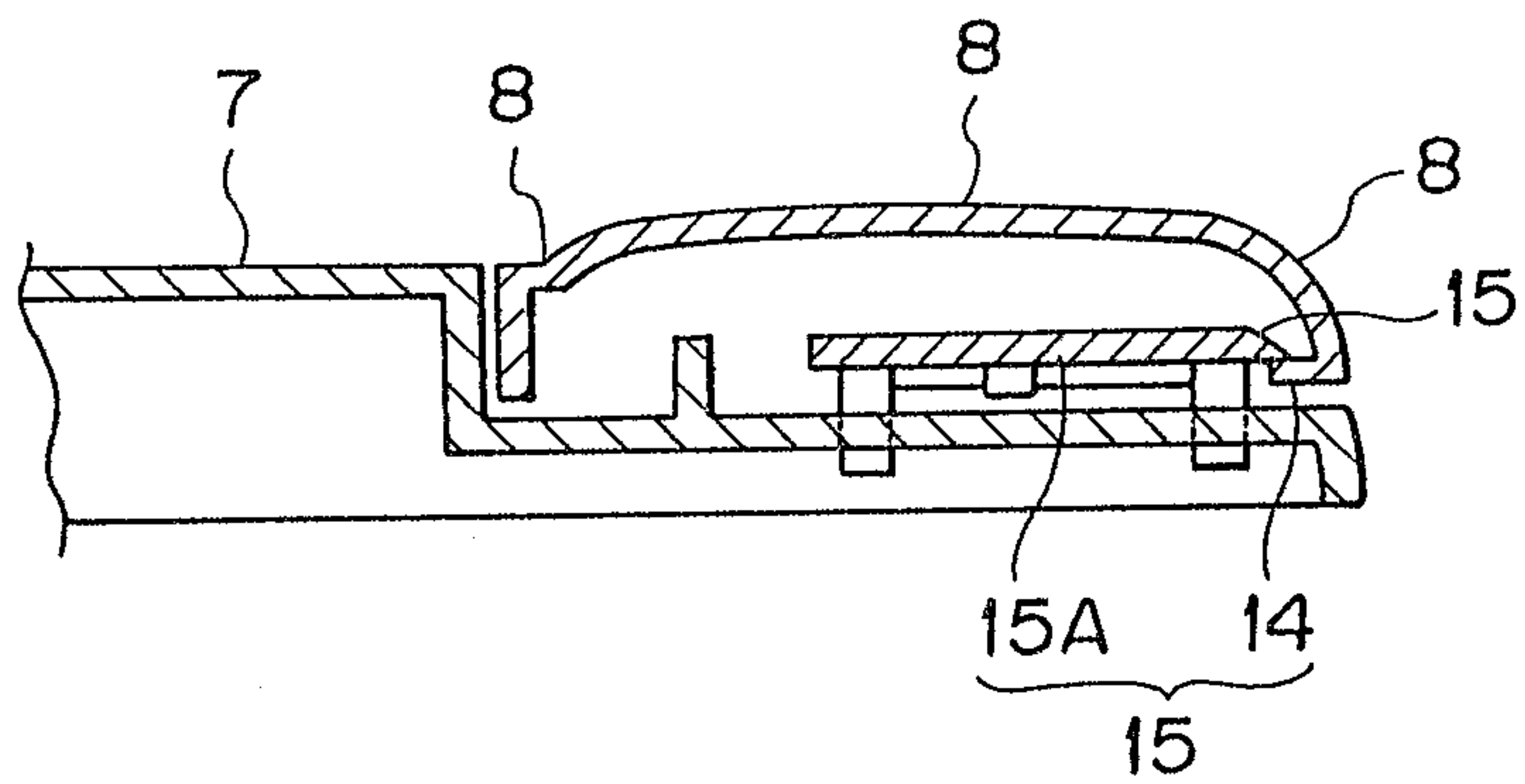


FIG. 12B

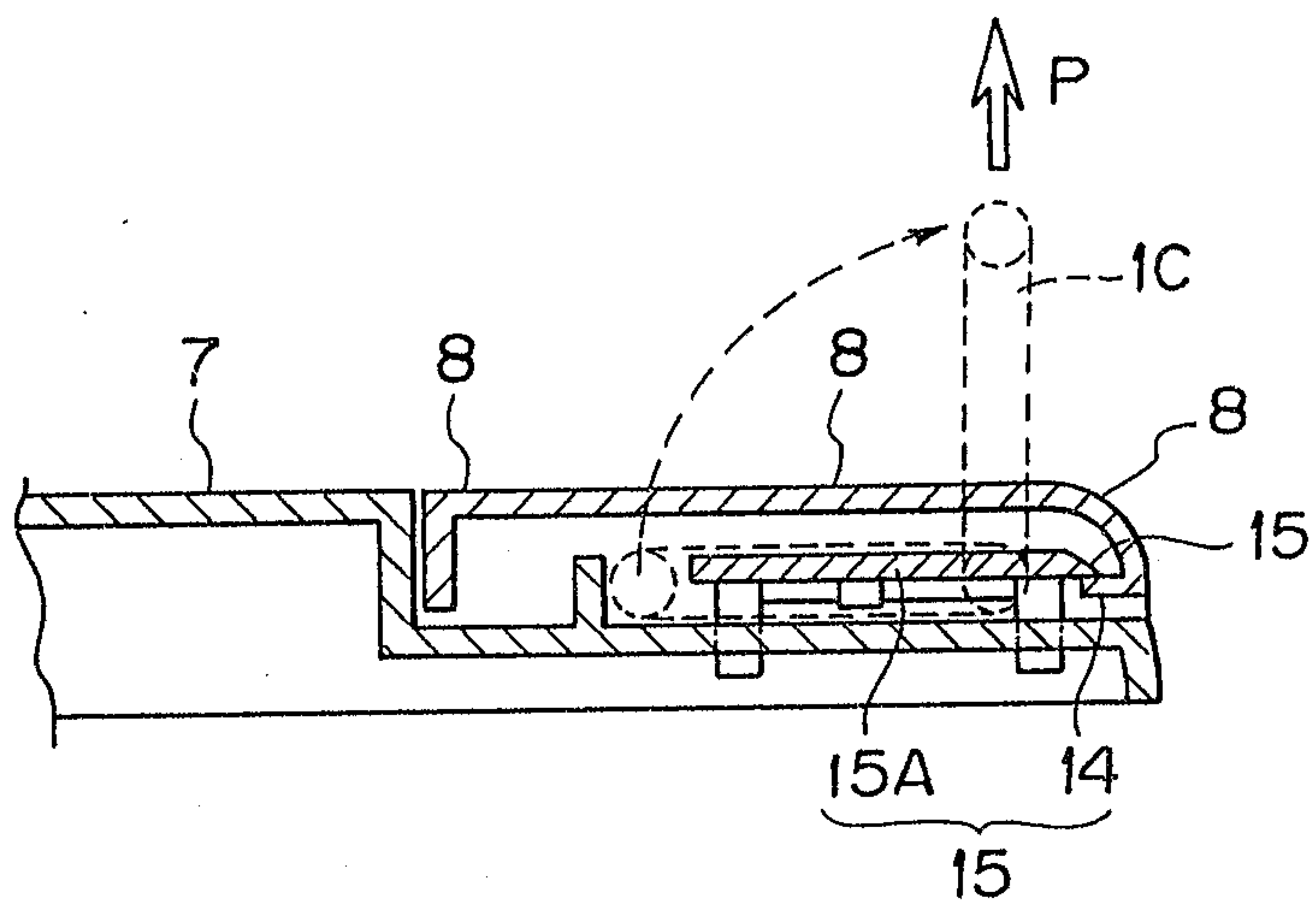


FIG. 13A

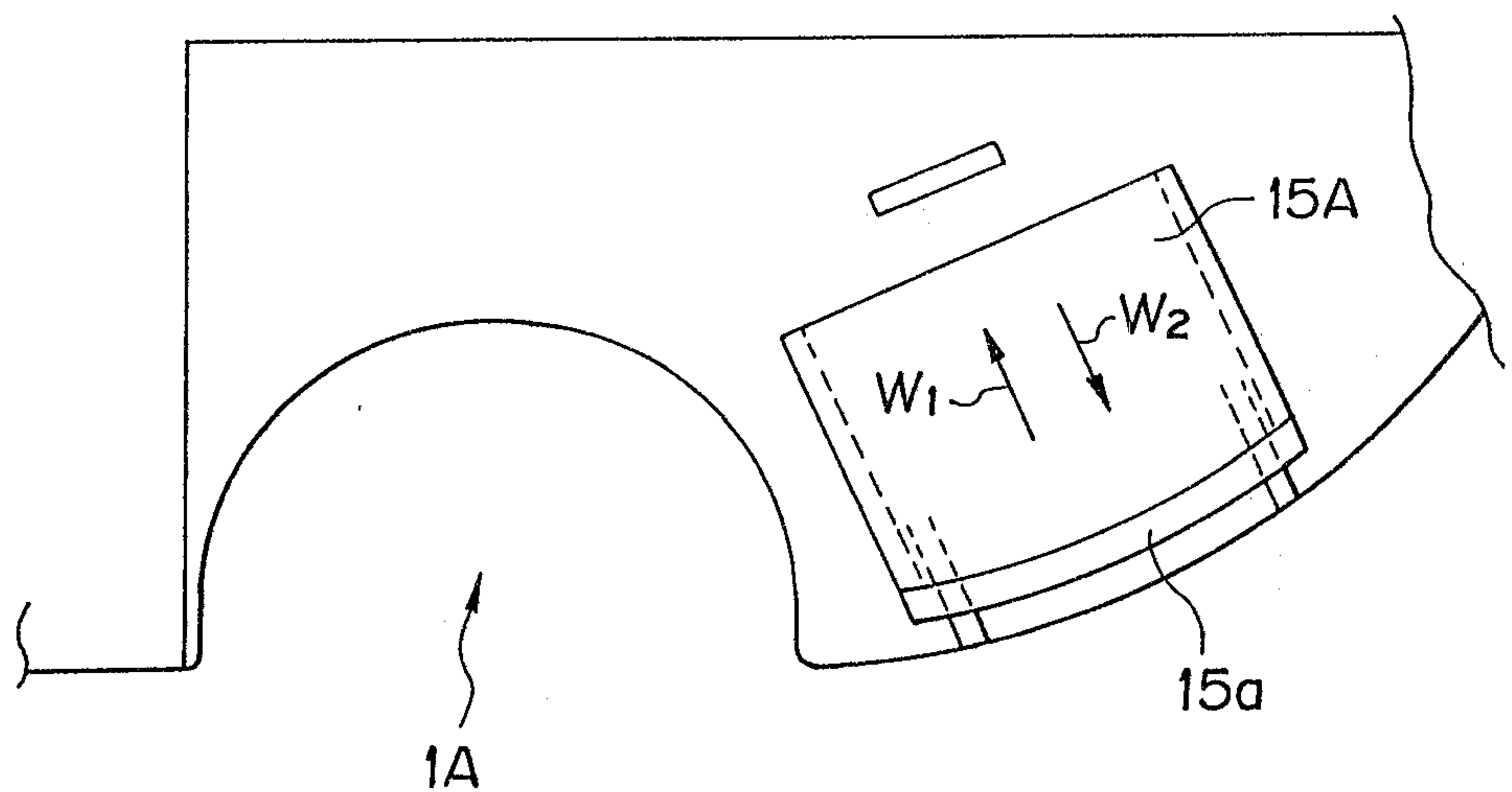
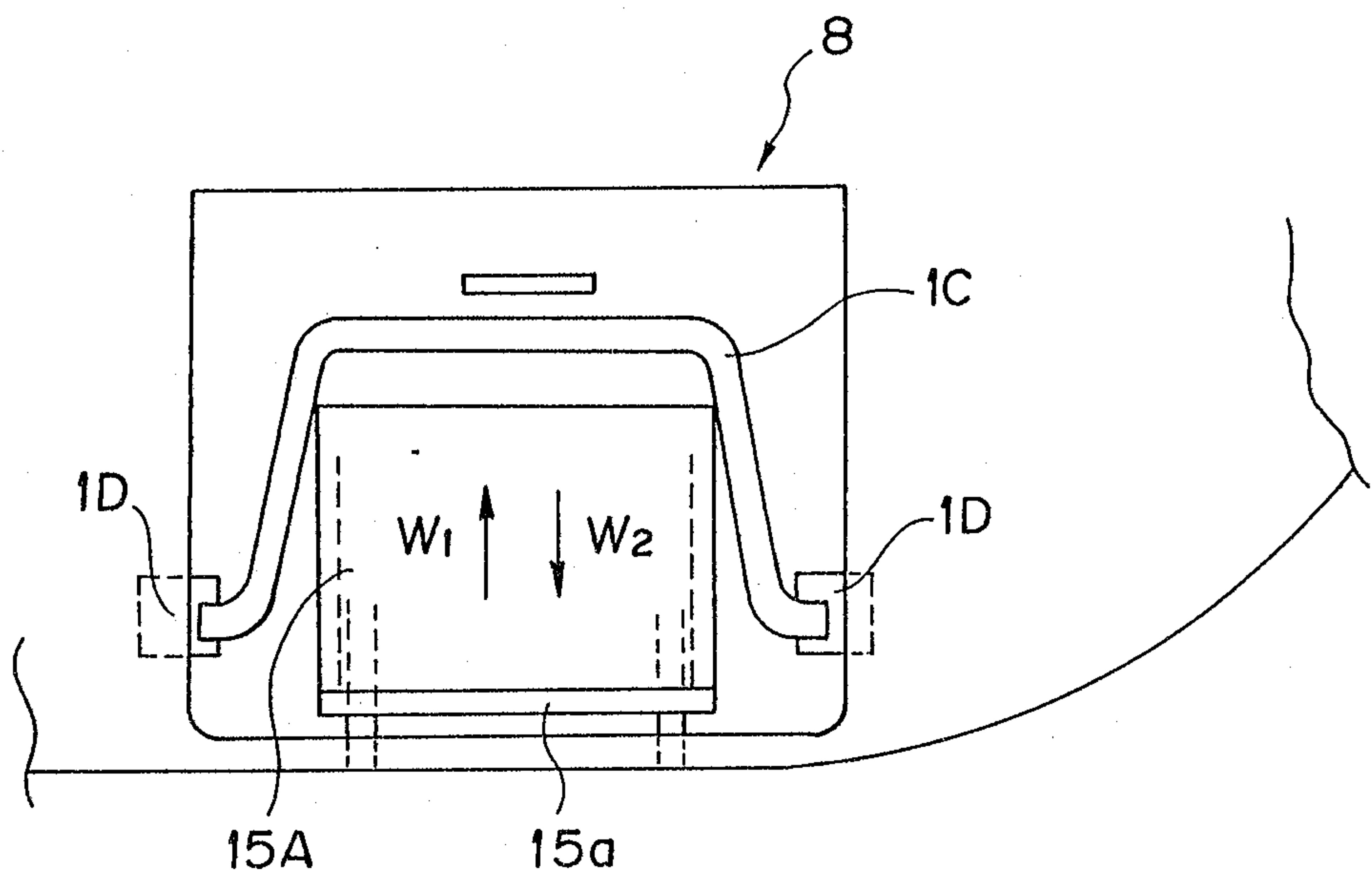


FIG. 13B



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FIG. 14

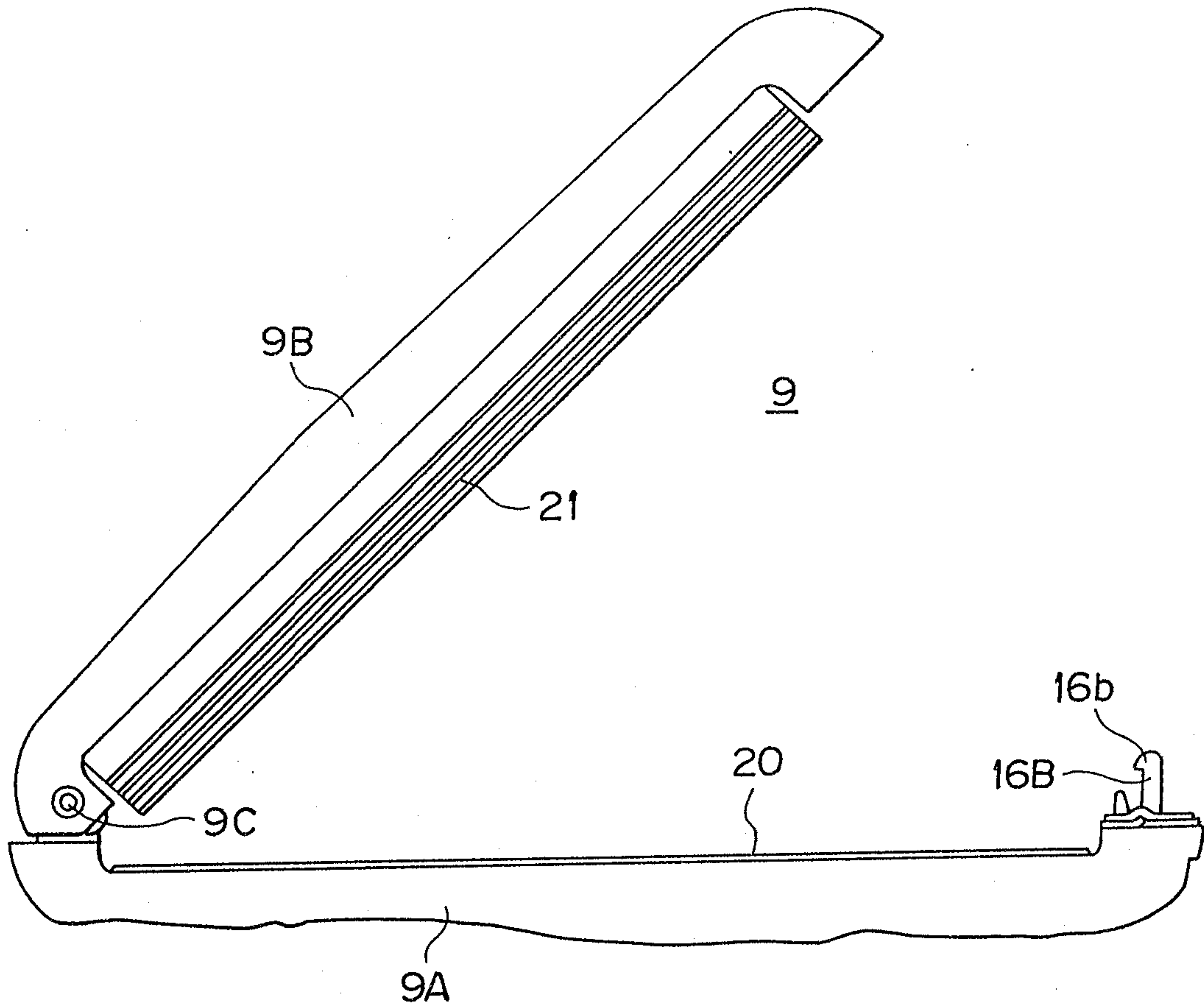


FIG. 15

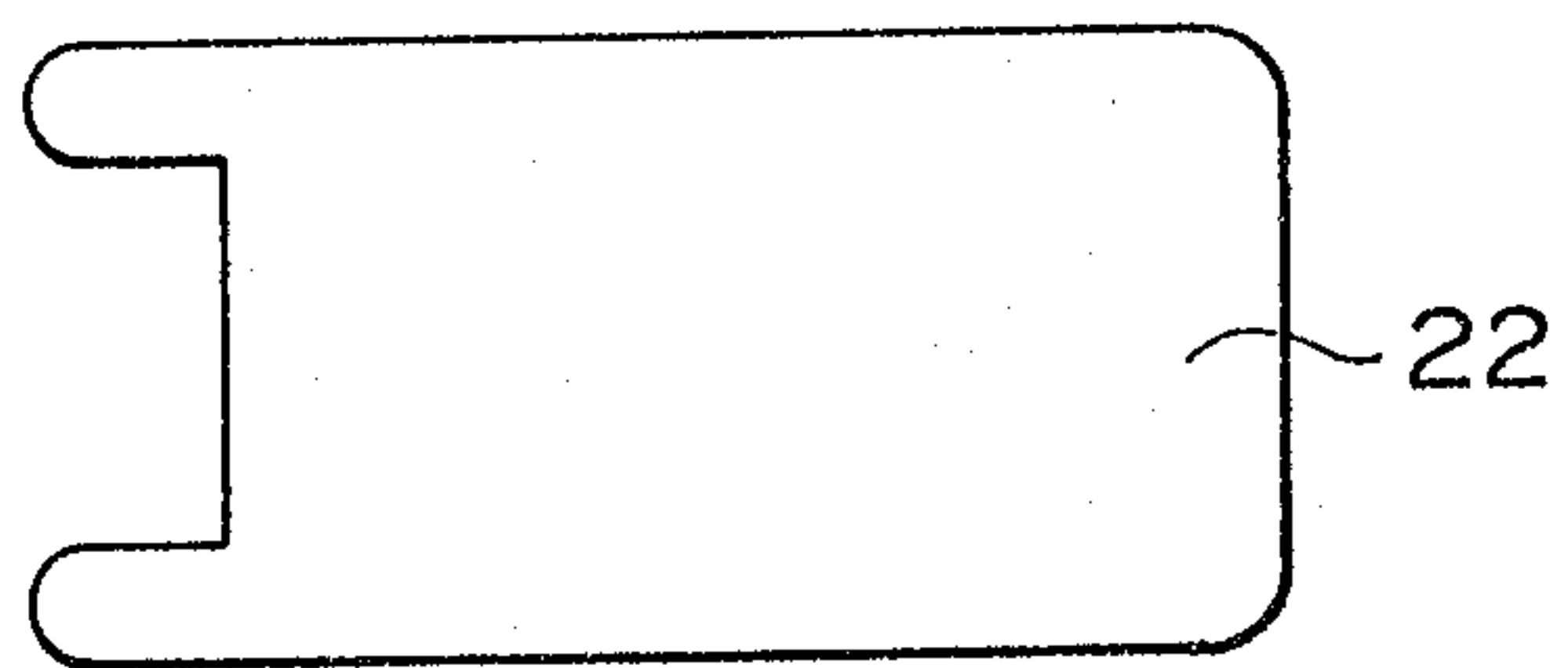


FIG. 16

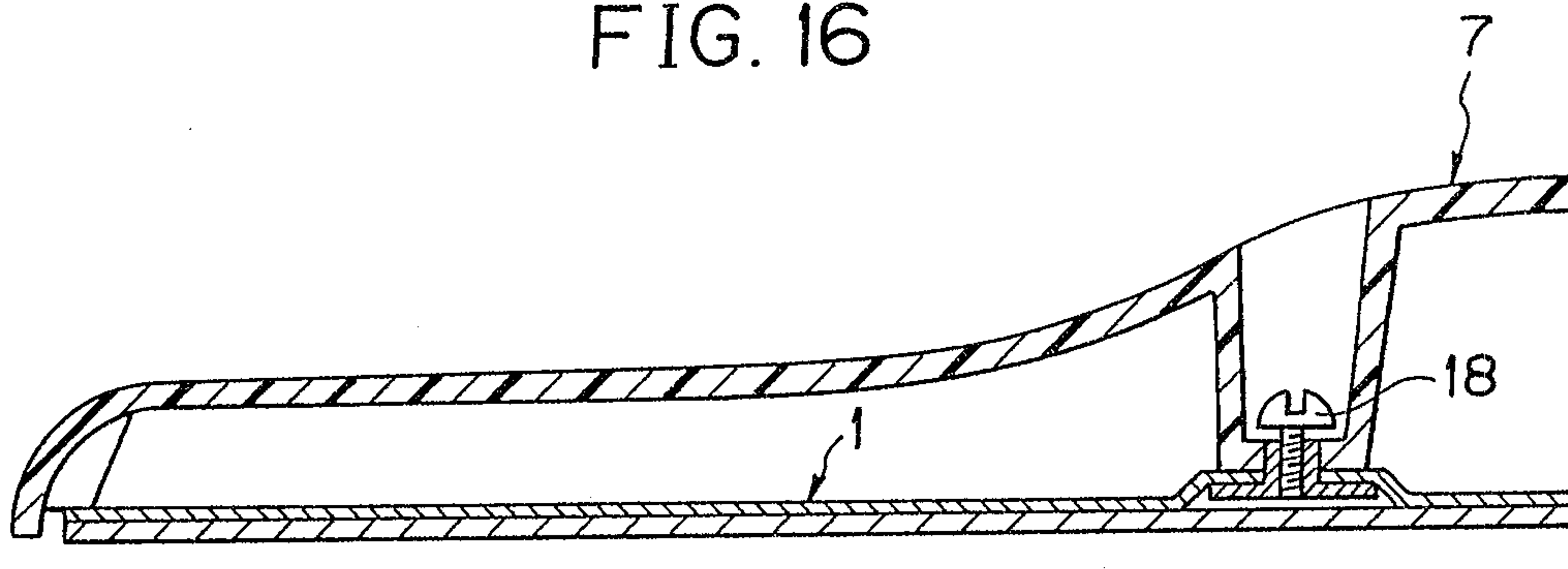


FIG. 17

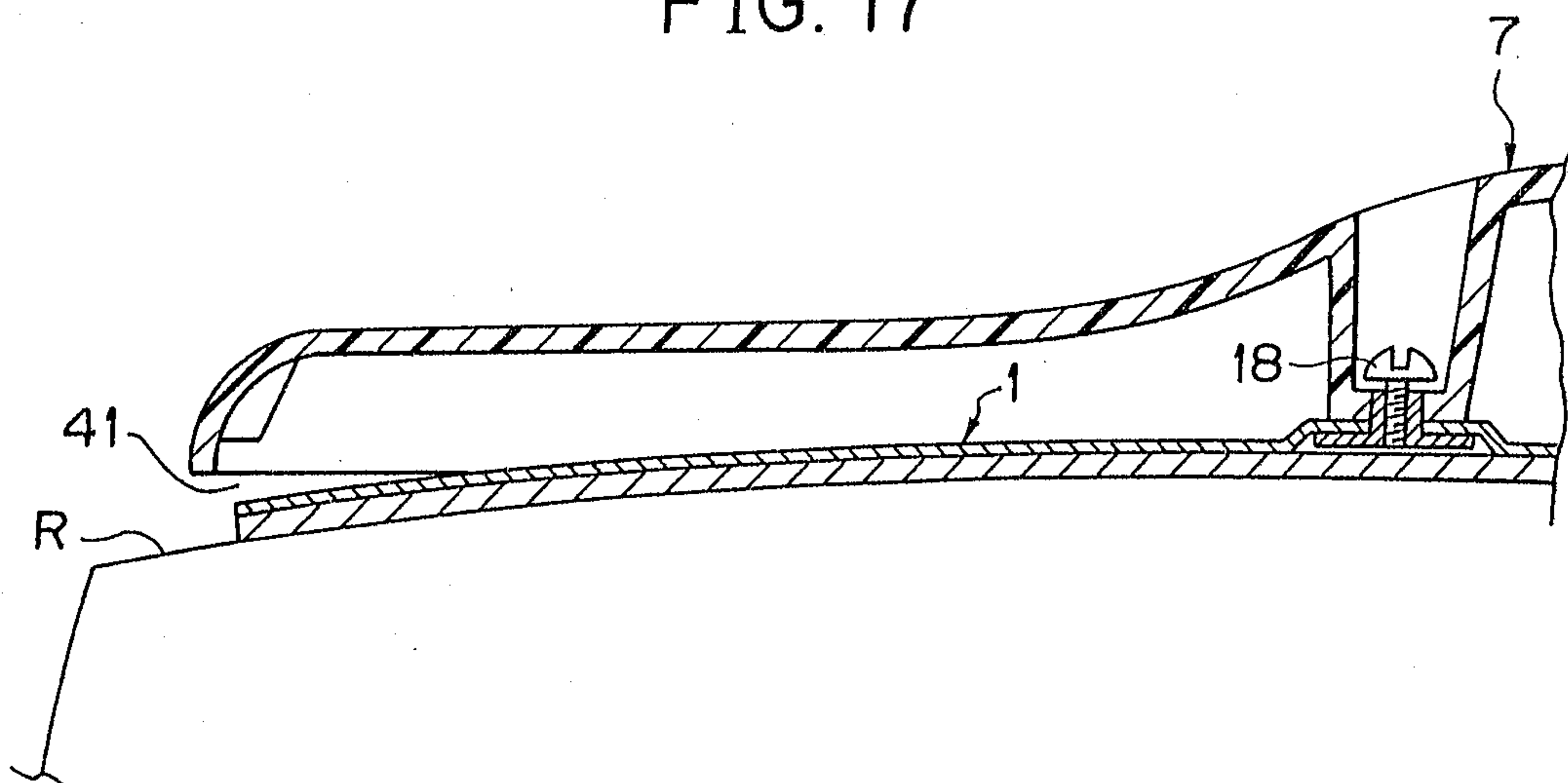


FIG. 18

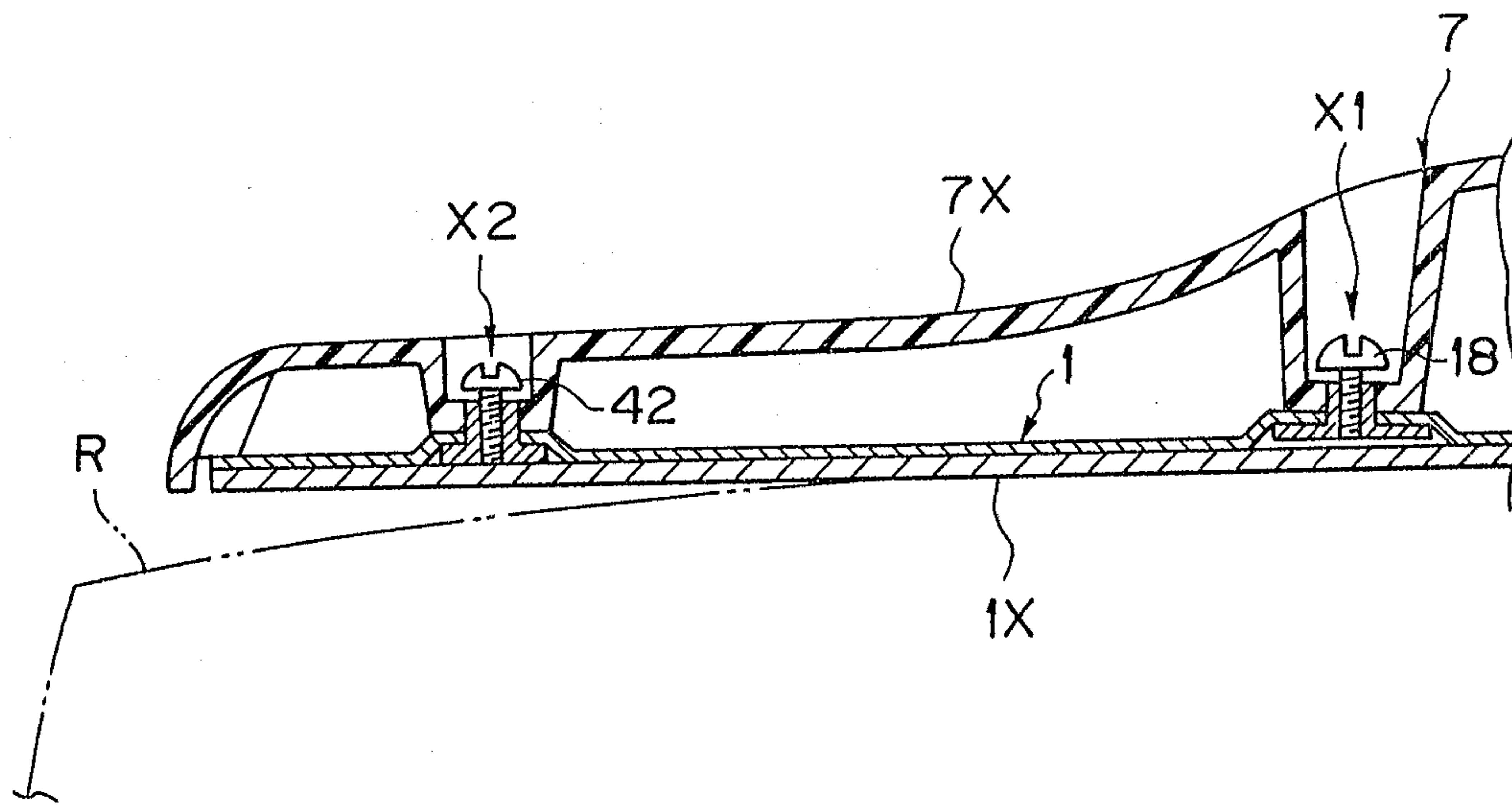


FIG. 19

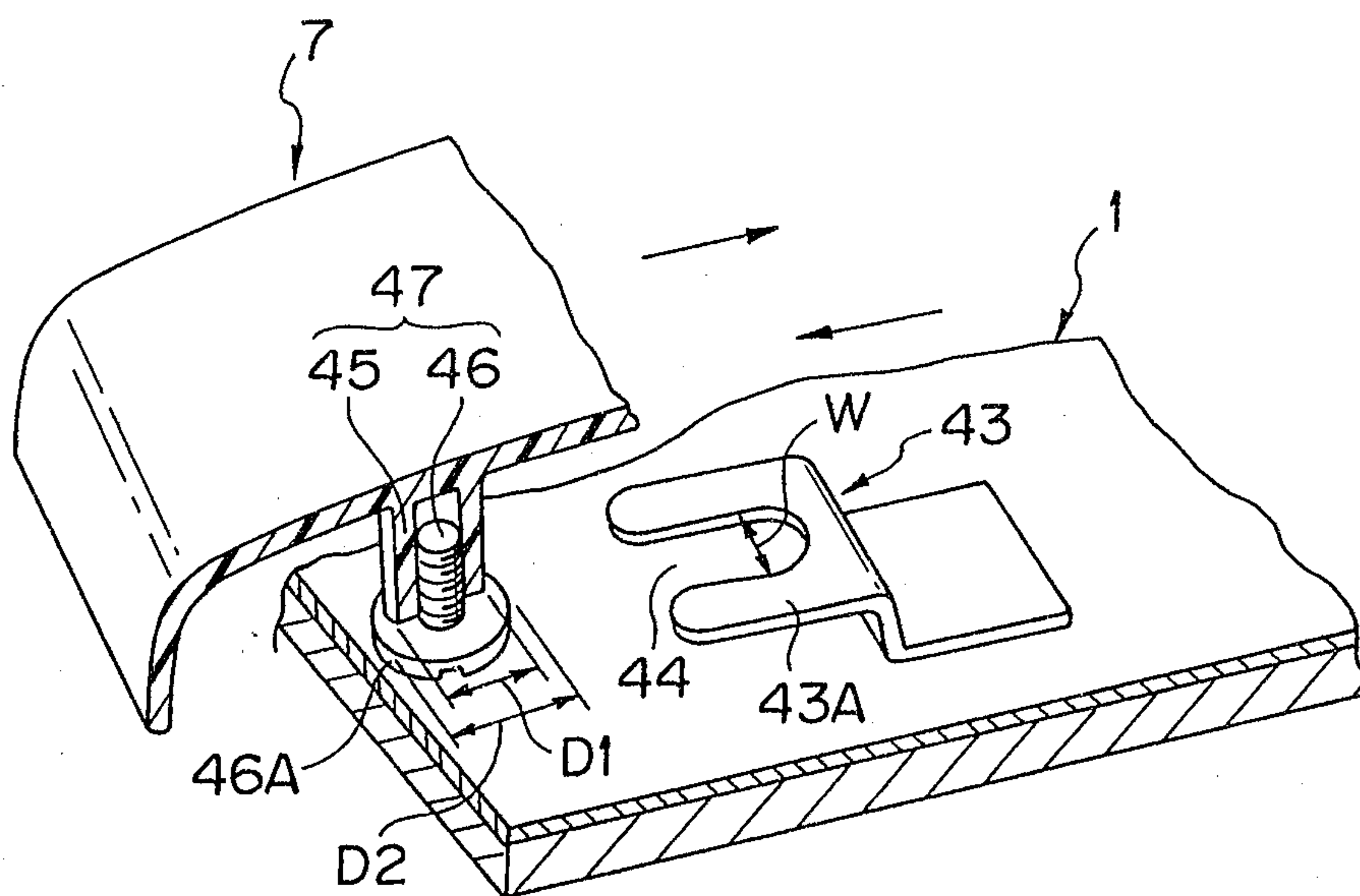


FIG. 20

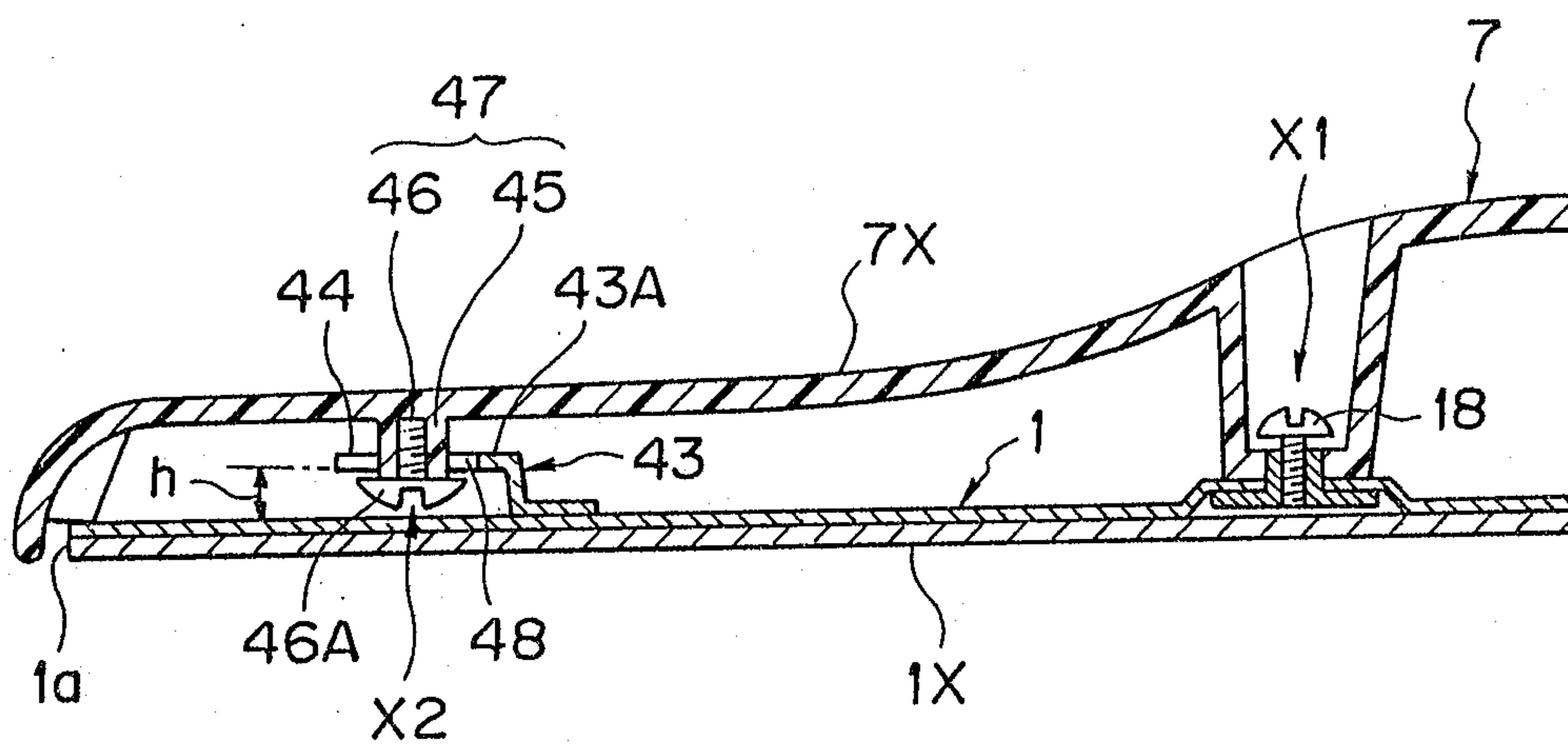


FIG. 21

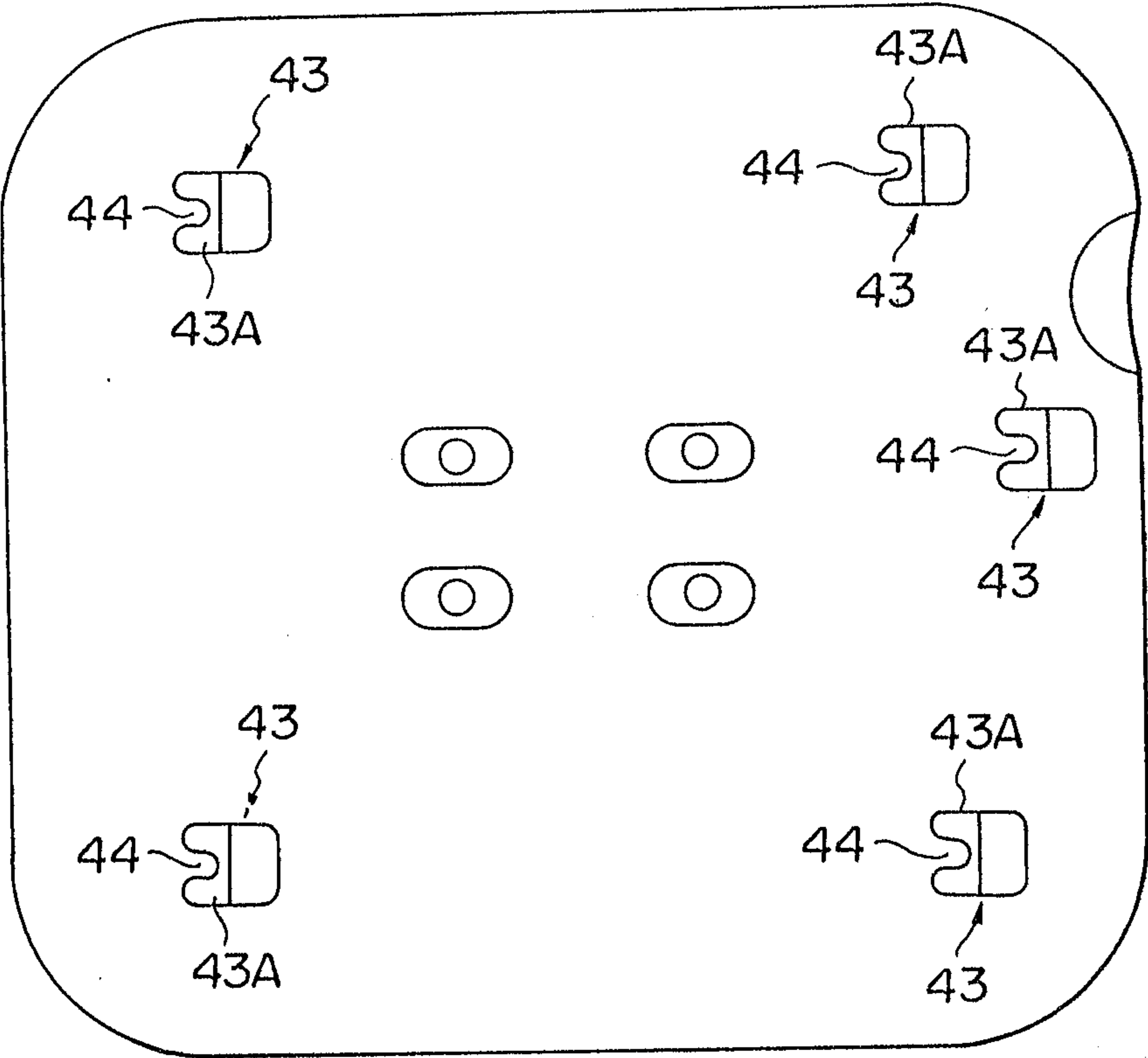


FIG. 22

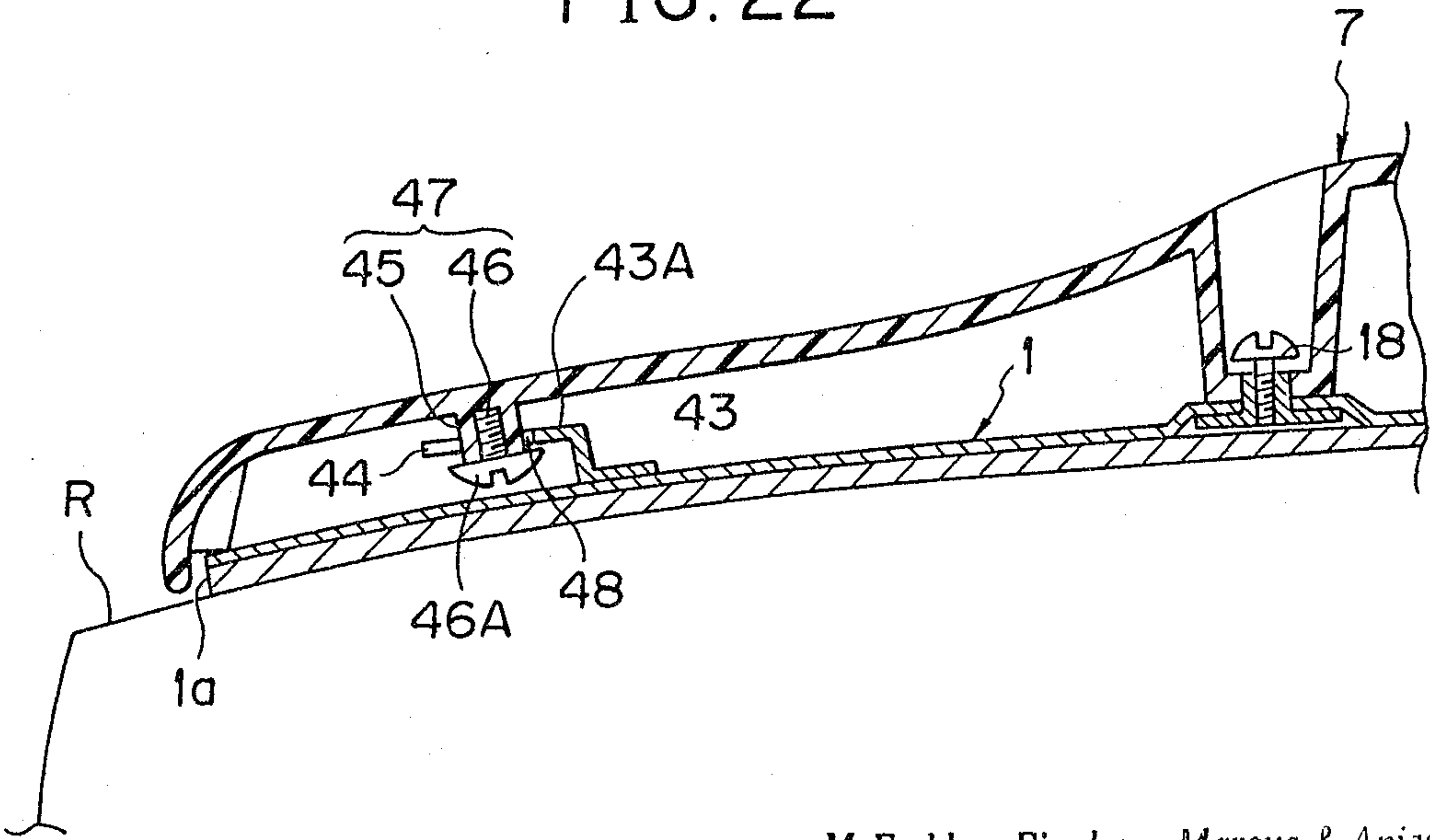


FIG. 23

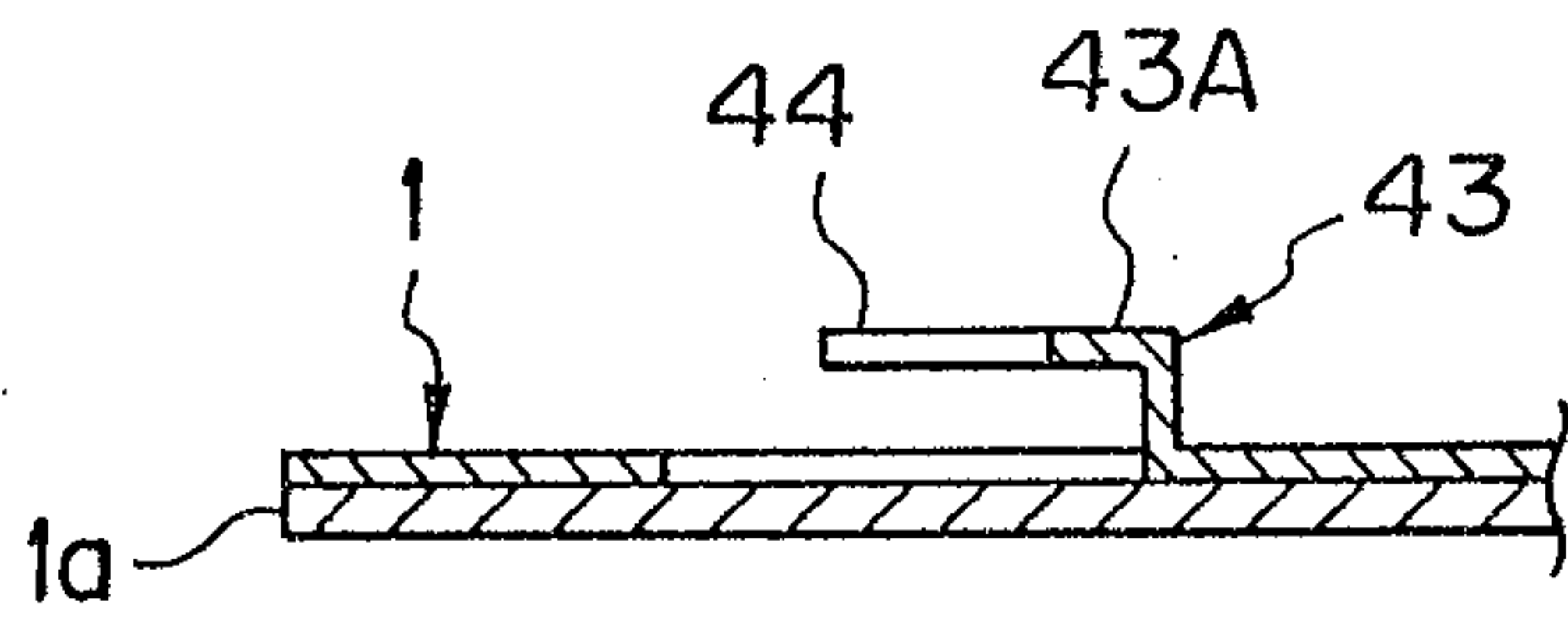


FIG. 24

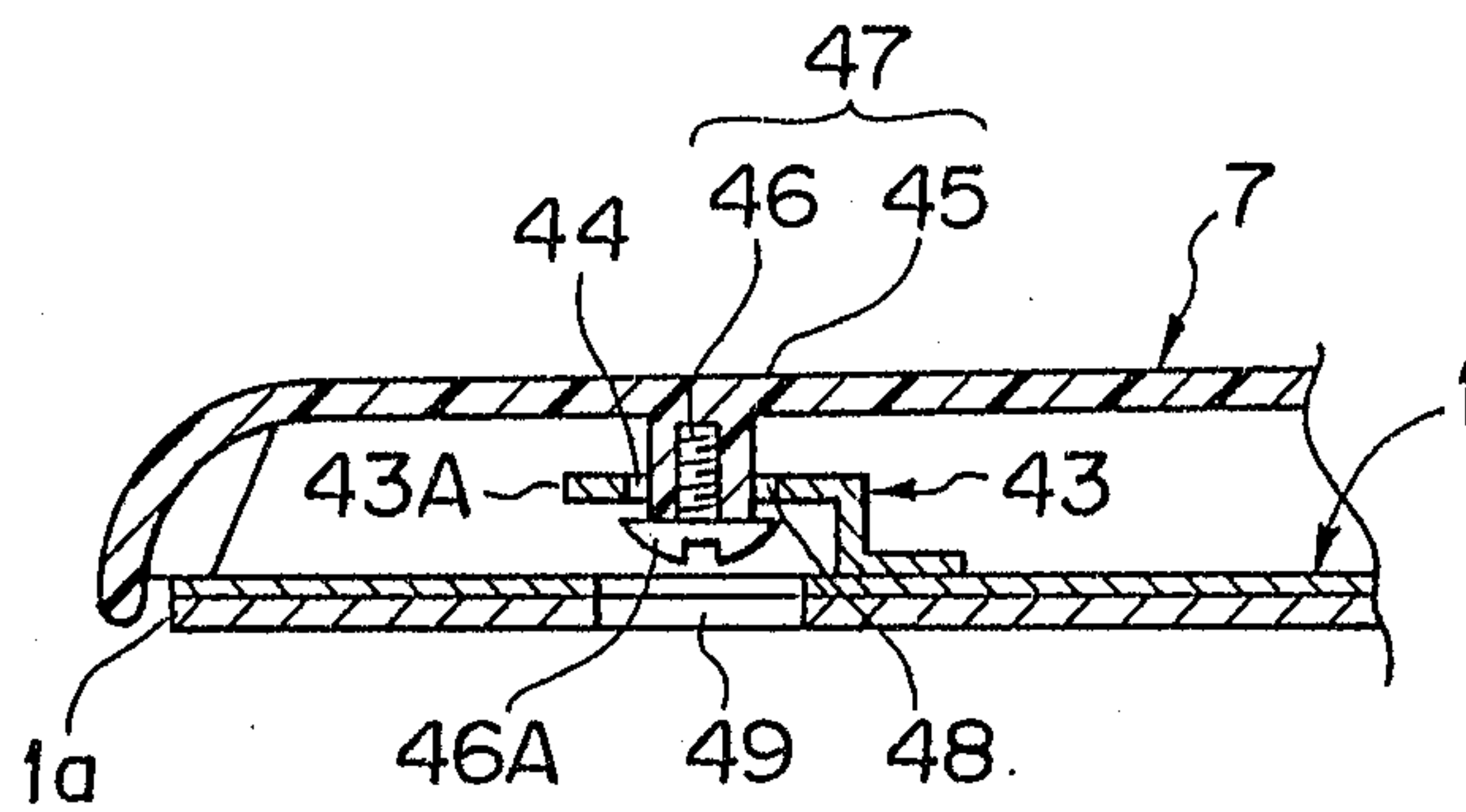


FIG. 25

