

DECLARATION

I, (Dwaine Palmer), hereby declare as follows:

1. I am a translator employed by Welocalize, Inc.

2. I have personal knowledge of the facts contained herein.

3. I am fluent in the English and Japanese languages

4. I have been a translator for over twenty years, specializing in the Japanese to English translation of patents and related intellectual property documents. For example, I have translated over 200 patent applications and 1000 prior art reference patents from the Japanese Language to the English language.

5. Attached as Exhibit A is the translation into English of Japanese PCT Patent Publication No. WO 2011/043352A1 filed October 5, 2010.

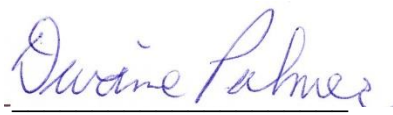
6. The attached document is, to the best of my knowledge and belief, a true and accurate translation of PCT Patent Publication No. WO 2011/043352A1 from the Japanese language into the English language.

7. In signing this declaration, I understand that my translation will be used as evidence of the contents of PCT Patent Publication No. WO 2011/043352A1.

8. In signing this declaration, I have been warned and I understand that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001).

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

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(71) Applicant (For all designated countries except
the US)
NIFCO INC. [JP/JP];
184-1, Maioka-cho, Totsuka-ku, Yokohama City,
Kanagawa 244-8522 (JP)

(72) Inventor; and

(75) Inventor/Applicant (for USA only): HIRANO
Yoichi

[JP/JP]; c/o NIFCO INC. [JP/JP];
184-1, Maioka-cho, Totsuka-ku, Yokohama City,
Kanagawa 244-8522 (JP)

YOSHII, Hiroyuki [JP/JP]; c/o NIFCO INC.
[JP/JP],
184-1, Maioka-cho, Totsuka-ku, Yokohama City,
Kanagawa 244-8522 (JP)

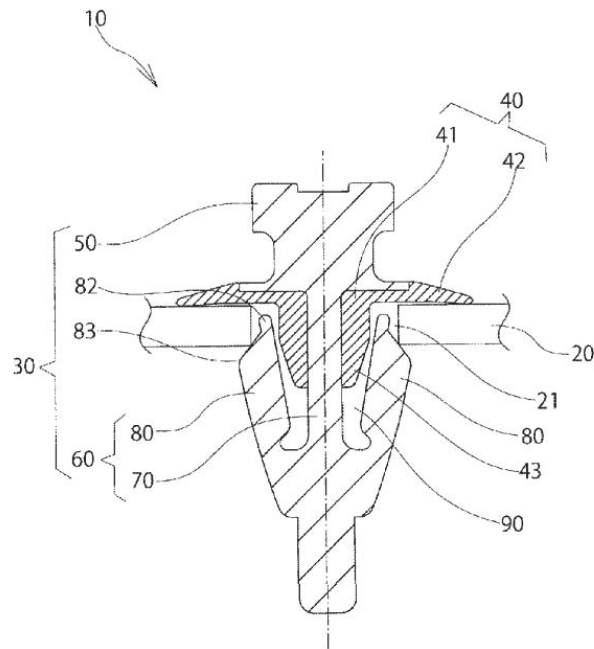
(74) Agent: OGAWA, Toshiharu et al.
al); SIA Kanda Square 4F, 17 Kanda Konya-cho,
Chiyoda-ku, Tokyo 101-0035 (JP).

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[Continued]

[FIG. 1]



(57) Abstract: Disclosed is a retainer provided with an insertion pin. The insertion pin is integrally provided with a head portion and a leg portion. The leg portion is comprised of a support rod extending downward from the head portion, and elastic locking portions extending from the lower portion of the support rod toward the head portion. The retainer is provided with a bush which is positioned at least between the outer circumferential portion of the support rod of the insertion pin and the elastic locking portions and which is composed of an elastic material having elasticity. The elastic material is a thermoplastic elastomer. The insertion pin and the bush are integrally formed.

WO 2011/043352 A1 

Attached documents:.

-International Search Report (PCT Article 21(3))

SPECIFICATION

(54) TITLE OF INVENTION: RETAINER

TECHNICAL FIELD

[0001] The present invention relates to a retainer for attaching other components to a panel, wherein a reduction in removal force when the retainer is reused can be suppressed by causing a bushing to function independently of an elastic locking portion.

BACKGROUND ART

[0002] Conventional retainers of this type are known to have ribs on the backside of both locking leg pieces in order to increase the engagement force of the fastening leg pieces to the panel (for example, refer to paragraph "0012", FIG. 1 and FIGS. 5-8 of Patent Document 1, hereinafter referred to as the "former document").

The conventional rib described above is connected on one end to the inner surface of the fastening leg piece, from which it rises inwardly at an angle to form a bend, and then extends straight upward along a support rod and is connected to an underside of a flange portion (for example, refer to paragraph number "0012" of patent document 1).

[0003] Conventionally, a bushing made of soft resin that fits around the outer circumference of the leg portions is known (for example, refer to lines 18-25 on the right-hand column on page 2 and FIGS. 1-4 of patent document 2, and lines 32-39 lines on the right-hand column on page 2 and FIGS. 1-4 of patent document 3, hereinafter referred to as "latter documents").

Background Technology Documents

Patent Documents

[0004] Patent Document 1: Japanese Patent No. 3607826

Patent Document 2: Japanese Unexamined Utility Model H04-32490

Patent Document 3: Japanese Unexamined Utility Model H05-15607

SUMMARY OF INVENTION

PROBLEM TO BE SOLVED BY INVENTION

[0005] However, there is a problem that the rib in the aforementioned former document (patent document 1) applies a large load to a connecting portion that connects the lower surface of the flange portion to an inner surface of the locking leg piece, thereby creep deformation will easily occur and the removal force easily drops when the retainer is reused.

In addition, the aforementioned bushing made of soft resin of the latter documents (Patent Document 2 and Patent Document 3) fits around the outer circumference of the leg portion, and therefore there is a problem of not having a function of assisting elastic recovery force of an elastic portion (Patent Document 2) or an expansion portion (Patent Document 3).

[0006] In light of the aforementioned problems of the conventional technology, an object of the present invention is to supplement the elastic recovery force of the elastic locking portion and to increase the removal force, by providing a bushing made of an elastic material between the outer circumference of the support rod and the elastic locking portion.

MEANS FOR SOLVING PROBLEM

[0007] The present invention achieves the aforementioned objectives, and is characterized by the following.

[0008] First, the retainer has the following configuration.

(1) Insertion pin

Second, the insertion pin is integral having the following configuration.

(2) Head portion

(3) Leg portion

Third, the leg portion has the following configuration.

[0009] (4) Support rod

The support rod is suspended down from the head portion.

(5) Elastic locking portion

The elastic locking portion extends from the lower part of the support rod in the direction of the head portion.

Fourth, the retainer has the following configuration.

[0010] (6) Bushing

The bushing is made of an elastic material and is located at least between the outer circumferential portion of the support rod of the insertion pin and the elastic locking portion.

The present invention may also include the following points

[0011] The elastic material is a thermoplastic elastomer. In this manner, the elasticity effect of the thermoplastic elastomer can be achieved.

The present invention may also include the following points

The insertion pin and the bushing are integrally molded. Therefore, the present invention, which can shorten the manufacturing process by integrally molding the insertion pin and the bushing, may have the following characteristics.

[0012] Second, the insertion pin is integral having the following configuration.

(1) Cylindrical portion

The cylindrical portion is mated to the insertion pin support rod.

(2) Flange portion

The flange portion extends outward radially from the upper end part of the cylindrical portion, and is larger in diameter than the inner diameter of the mounting holes in the panel.

In this manner, the watertightness of the panel mounting holes can be enhanced by the bushing having the cylindrical portion and the flange portion.

EFFECT OF INVENTION

[0013] The present invention is composed as described above, and therefore the elastic recovery force of the elastic locking portion can be supplemented and the removal force can be enhanced by providing a bushing made of elastic material between the outer circumferential portion of the support rod and the elastic locking portion.

[0014] In addition, a drop in the removal force when the retainer is reused can be suppressed by causing the bushing to function independent from the elastic locking portion.

BRIEF DESCRIPTION OF DRAWINGS

[0015] FIG.1 is a cross-sectional view illustrating a condition where the retainer is attached to the panel.

FIG.2 is a perspective view of the retainer.

FIG.3 is a side view illustrating a cross-section of one half of the retainer.

FIG.4 is another side view illustrating a cross-section of one half of the retainer.

FIG.5 is a plan view of the retainer.

FIG.6 is a cross-sectional view of the mold.

FIG.7 is a cross-sectional view of a condition where the retainer is attached to a panel having a relatively thin plate thickness.

FIG.8A-C are explanatory diagrams for describing the retainer attaching procedures.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0016] In the figures, 10 represents a retainer 10, which is used to attach other parts, such as weather stripping and the like to panels 20 such as around the door of an automobile or the opening edge of a trunk compartment.

Note that the area around the door of an automobile and the opening edge of the trunk compartment are provided as examples of the panel 20, but there is no restriction to the area around the door or the opening edge of the trunk compartment, and there is also no restriction to being used in automobiles.

[0017] The panel 20 is provided with round mounting holes 21 through the front and back surfaces of the panel 20, as illustrated in FIG. 1. The shape of the mounting hole 21 is shown as round as an example, but the shape is not limited to this.

As illustrated in FIGS. 1 and 7, there are several types of panels 20, for example, thick panels 20 and relatively thin panels 20a. Note that the thickness of the panels 20, 20a is not limited to two types, and there may be three or more types.

[0018] As illustrated in FIGS. 1-5, the retainer 10 has, broadly speaking, the following parts. Note that the following (1) and (2) are described below.

(1) Insertion pin 30

(2) Bushing 40

Note that the parts of the retainer 10 are not limited to just (1) and (2) above.

(Insertion pin 30)

As illustrated in FIG. 1, the insertion pin 30 is fastened by inserting into a mounting hole 21 of the panel 20, and attaches weather stripping (not illustrated) to a portion protruding from the surface of the panel 20. Furthermore, the insertion pin 30 is integrally molded from a relatively hard thermoplastic resin having moderate elasticity and rigidity, such as POM (polyoxymethylene), for example.

[0019] As illustrated in FIGS. 1-5, the insertion pin 30 has, broadly speaking, the following parts. Note that the following (1) and (2) are described below.

(1) Head portion 50

(2) Leg portion 60

Note that the parts of the insertion pin 30 are not limited to just (1) and (2) above.

(Bushing 40)

As illustrated in FIGS. 1-5, the bushing 40 is made of an elastic material having elasticity, and is located at least between the outer circumferential portion of the support rod 70 of the insertion pin 30 and the elastic locking portion 80 also described later. The elastic material is a thermoplastic resin, such as an elastomeric resin, which has high elasticity and is softer than the insertion pin 30. The bushing 40 is molded in a second stage to the insertion pin 30, as described below.

[0020] Specifically, as illustrated in FIGS. 1-5, the bushing 40 has, broadly speaking, the following parts.

(1) Cylindrical portion 41

The cylindrical portion 41 mates to the support rod 70 described below of the insertion pin 30, as illustrated in FIGS. 1 and 4.

A plurality of legs 43, 44, for example, four legs extend from the lower end portion of the cylindrical portion 41 at 90-degree intervals, as illustrated in FIGS. 1 to 4.

[0021] As illustrated in FIGS. 1 and 2, of the four legs 43, 44, a pair of first legs 43, facing away from each other, are located between the outer circumferential portion of the support rod 70 and the elastic locking portion 80, also described below.

As illustrated in FIGS. 2-4, of the four legs 43, 44, the remaining second pair of legs 43, facing away from each other, are at a different phase, 90 degrees from the first legs 43, and extend longer than the first legs 43. Although four legs 43 and 44 are formed, this is not a limitation, and one leg may be formed in the form of a ring, or two, three, five or more legs may be formed.

[0022] (2) Flange portion 42

As illustrated in FIGS. 1-5, the flange portion 42 extends outward radially from the upper end portion of the cylindrical portion 41, and has a larger diameter than the inner diameter of the mounting holes 21 in the panel 20. Specifically, as illustrated in FIGS. 2-4, the outer circumferential edge portion of the flange portion 42 extends diagonally downward in an umbrella shape, and the wall thickness is made to be relatively thin to facilitate deflection.

[0023] As illustrated in FIGS. 1 and 7, the flange portion 42 elastically adheres to the surface of two panels 20, 20a having different thicknesses. Therefore, in addition to the sealing effect, the flange portion 42 can allow for changes in the thickness of the panels 20, 20a.

(Head portion 50)

As illustrated in FIG. 1, the head portion 50 extends upward from the surface of the panel 20 and attaches weather stripping (not illustrated) in a condition where the leg portion 60 is inserted into the mounting holes 21 of the panels 20.

[0024] Specifically, as illustrated in FIGS. 2-5, the head portion 50 has, broadly speaking, the following parts.

(1) Center shaft portion 51

The center shaft portion 51 extends slightly in a cylindrical shape as illustrated in Figures 2-4.

(2) Extending portion 52

The extending portion 52 extends in the form of a ring from the lower end portion of the center shaft portion 51 and joins to the upper surface of the flange portion 42 of the bushing 40, as illustrated in Figures 3-5.

[0025] (3) Piercing portion 53

As illustrated in FIGS. 2-5, the piercing portion 53 extends from the lower end portion of the center shaft portion 51 in a T-shape, and is formed in an essentially rhomboid shape having both end portions narrowing to a tapered shape when viewed from the top surface, as illustrated in FIG. 5. The piercing portion 53 is not illustrated, but is pierced into the weather stripping and secured in an embedded form.

(Leg portion 60)

The leg portion 60 is fastened to the panel 20 by being inserted into the mounting holes 21 of the panel 20, as illustrated in FIG. 1.

[0026] Specifically, as illustrated in FIGS. 1-4, the leg portion 60 has, broadly speaking, the following parts.

(1) Support rod 70

The support rod 70 suspends down from the head portion 50 in a square cylindrical shape as illustrated in FIGS. 1 to 4. The support rod 70 is formed in a square cylindrical shape, but this is not a limitation, and the support rod may also be formed in a cylindrical shape, for example.

[0027] (2) Elastic locking portion 80

The elastic locking portion 80 extends from the lower part of the support rod 70 in the direction of the head portion 50, as illustrated in FIGS. 1-4.

Specifically, the elastic locking portion 80 extends from the lower part of the support rod 70 in an essentially V-shape toward the lower surface of the flange portion 42 of the bushing 40, as illustrated in FIGS. 2 and 4. The elastic locking portion 80 is formed in a plurality of pieces, for example a pair, which are in different phases by 90 degrees with regard to the protruding direction of the piercing portion 53. The maximum outer diameter of the pair of elastic locking portions 80 is set to be larger than the inner diameter of the mounting holes 21 of the panel 20.

[0028] Although a pair of elastic locking portions 80 are formed, this is not a limitation, and three or more may be formed.

On the other hand, a gap 90 is formed between the elastic locking portion 80 and the outer circumferential portion of the support rod 70, as illustrated in FIGS. 2 and 4, and the first leg 43 of the bushing 40 is located in the gap 90.

Specifically, as illustrated in FIGS. 2-4, the elastic locking portion 80 has, broadly speaking, the following parts.

[0029] (1) Necked portion 81

The necked portion 81 is located at the base of the elastic locking portion 80, as illustrated in FIGS. 2 and 4, and is necked to be concave from above to below. The necked portion 81 facilitates deflection of the elastic locking portion 80 and functions as a hinge.

(2) Tip end protruding portion 82

The tip end protruding portion 82 extends convexly from the tip end portion of the elastic locking portion 80, as illustrated in FIGS. 2 and 4. The tip end protruding portion 82 elastically contacts the inner edge portion of the mounting hole 21 of the relatively thin panel 20a, as illustrated in FIG. 7, and clasps the panel 20a from the front and back surfaces against the lower surface of the flange portion 42 of the bushing 40. The tip end protruding portion 82, together with the tip end sloping portion 83, described below, is to provide tolerance for the thickness of the panels 20, 20a.

[0030] (3) Tip end sloping portion 83

The tip end sloping portion 83 is formed on the outer surface of the tip end portion of the elastic locking portion 80, as illustrated in FIGS. 2 and 4, and slopes diagonally such that the wall thickness of the elastic locking portion 80 gradually decreases toward the tip end protruding portion 82. The tip end protruding portion 83 elastically contacts the inner edge portion of the mounting hole 21 of the relatively thick panel 20a, as illustrated in FIG. 1, and clasps the panel 20a from the front and back surfaces against the lower surface of the flange portion 42 of the bushing 40.

(Molding method)

Next, the method for molding the retainer 10 will be described using the mold 100 illustrated in FIG. 6.

[0031] As illustrated in FIG. 6, the mold 100, broadly includes a stationary side mold 110 and a movable side mold 120. In FIG. 6, 130 indicates the parting line and 140 indicates the frame division line.

First, the stationary side mold 110 and movable side mold 120 are closed and the insertion pin 30 is first molded using a relatively hard thermoplastic resin such as POM (polyoxymethylene), for example.

[0032] Then, using a relatively soft thermoplastic resin such as a class 1 elastomer, the bushing 40 is molded in a second stage to the retainer 10.

(Mounting method)

Next, a method for mounting weather stripping (not shown) using the retainer 10 having the above configuration will be described.

[0033] First, although not illustrated, the piercing portion 53 of the insertion pin 30 is inserted into the weather stripping and secured in an embedded form.

Next, the legs portion 60 of the insertion pin 30 aligned and inserted into the mounting holes 21 of the panel 20, as illustrated in Figure 8A.

When the leg portion 60 is inserted, the outer surface of the pair of elastic locking portions 80 contacts the inner edge of the mounting hole 21, as illustrated in Figure 8A.

[0034] Here, when the leg portion 60 is strongly inserted, as illustrated in FIG. 8B, the outer surface of the pair of elastic locking portions 80 is pushed against the inner edges of the mounting holes 21 and deflects in the direction approaching each other. As a result, the outer diameter of the leg portion 60 is reduced and the pair of elastic locking portion 80 passes through the mounting holes 21. At this time, the inner surface of the pair of elastic locking portions 80 contacts the first leg 43 of the bushing 40, as illustrated in Figure 8B. The first leg 43 is deformed by pressing to the inner surface of the elastic locking portion 80 to reduce the wall thickness and accumulate recovery force.

[0035] When the elastic locking portion 80 passes through the mounting hole 21, as illustrated in FIG. 8C, recovery occurs on the back side of the panel 20 due to the elastic recovery force of the resin, and

the tip end sloped portion 83 elastically contacts the inner edge portion of the mounting hole 21 and clasps the panel 20 from the front and back sides against the lower surface of the flange portion 42 of the bushing 40.

Therefore, although not illustrated, the weather stripping is fastened to the panel 20 via the retainer 10.

[0036] On the other hand, when the elastic locking portion 80 recovers, the retracted first leg 43 is elastically pressed to the inner surface of the elastic locking portion 80 by thickening of the wall thickness due to the elastic recovery force of the resin.

Therefore, in addition to the recovery force of the relatively hard resin such as POM (polyoxymethylene), the recovery force of a relatively soft resin such as an elastomeric monomer will have effect.

Therefore, due to the elasticity effect of the bushing 40, the effect of degradation due to creep when the retainer 10 is reused, for example after the second time, can be reduced and the retention force can be maintained at a high value.

[0037] On the other hand, as illustrated in FIG. 7, in the case of a relatively thin panel 20a, as illustrated in FIG. 7, the tip end protruding portion 82 elastically contacts the inner edge of the mounting hole 21 and holds the panel 20a against the lower surface of the flange portion 42 of the bushing 40, clamping the panel 20a from the front and back surfaces.

The entire Specification, Claims, Drawings and abstract of Japanese Patent Application No. 2009-232280, filed on October 6, 2009, are hereby quoted and incorporated as a disclosure of the Specification of the invention.

SCOPE OF PATENT CLAIMS

[Claim 1]

A retainer, comprising:

a head portion; and

an insertion pin integrally including a support rod suspending down from the head portion and a leg portion including an elastic locking portion extending from a lower part of the support rod in a direction of the head portion;

wherein the retainer includes:

a bushing made of an elastic material having elasticity, positioned at least between a circumferential part of the support rod of the insertion pin and the elastic locking portion.

[Claim 2]

The retainer according to claim 1, wherein
the elastic material is a thermoplastic elastomer.

[Claim 3]

The retainer according to claim 2, wherein
the insertion pin and the bushing are integrally formed.

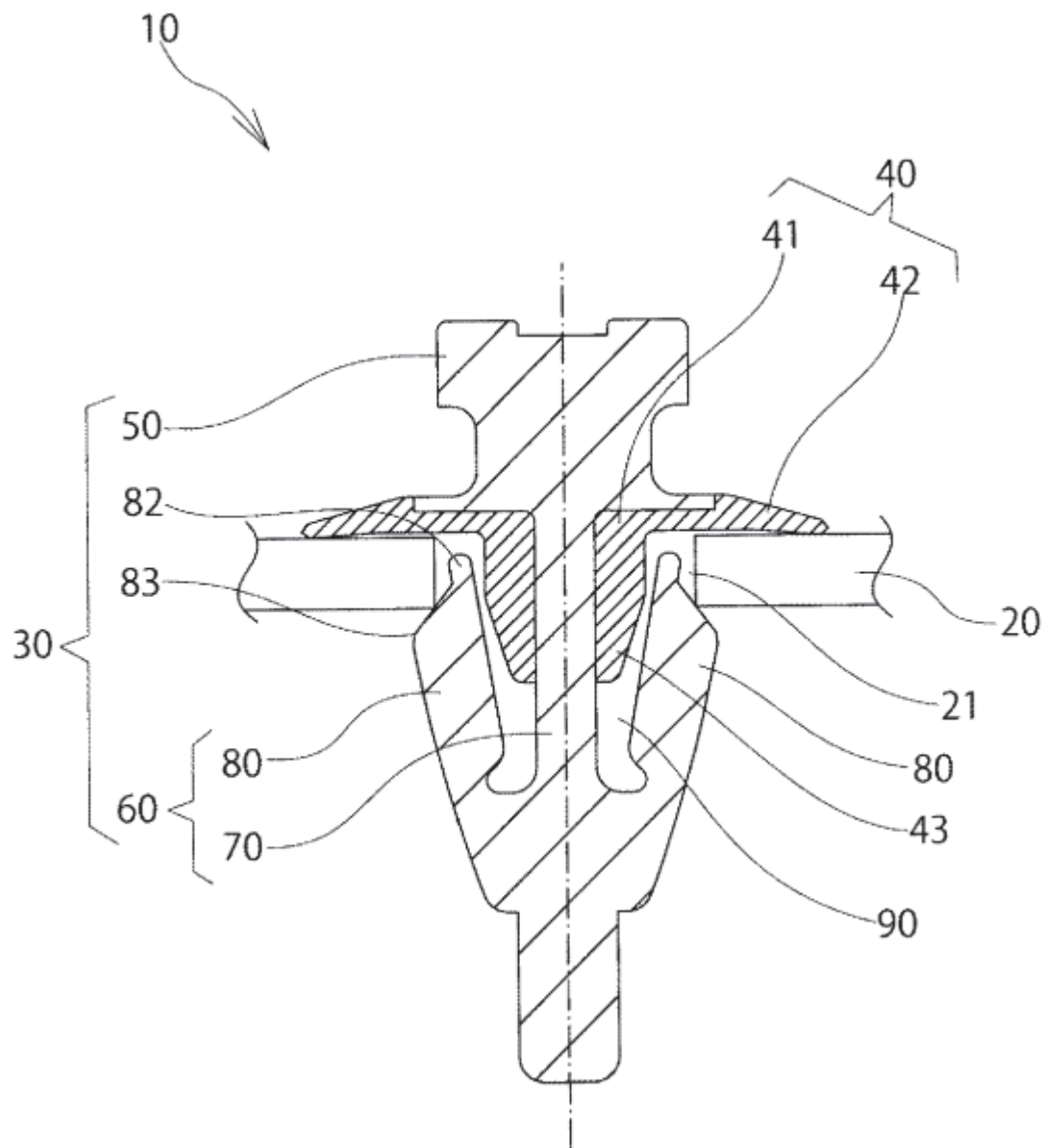
[Claim 4]

The retainer according to any one of claims 1 to 3, wherein
the bushing integrates:

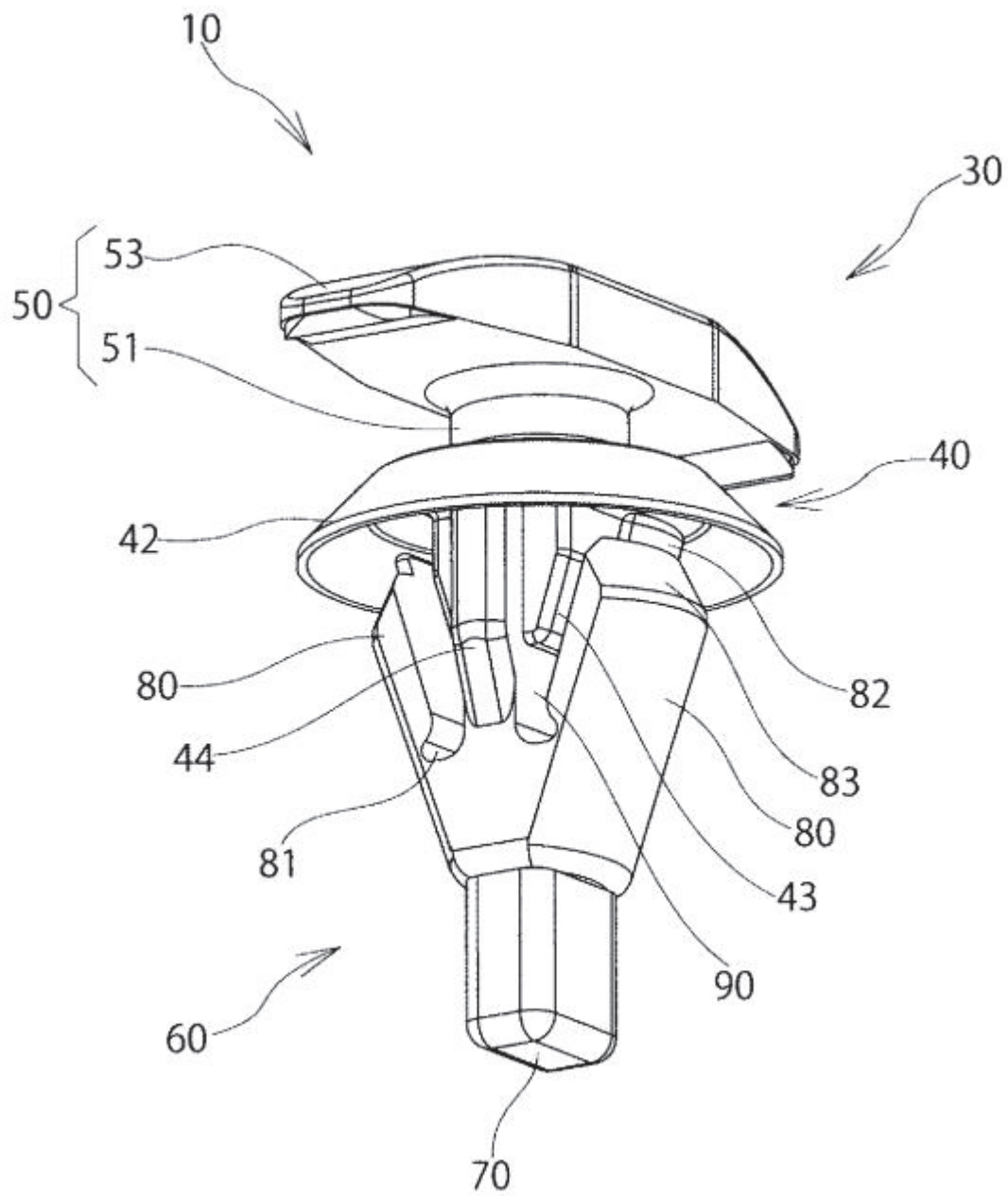
a cylindrical portion mated to the insertion pin support rod; and

a flange portion extending outward radially from an upper end part of the cylindrical portion, and having a larger diameter than an inner diameter of mounting holes in a panel.

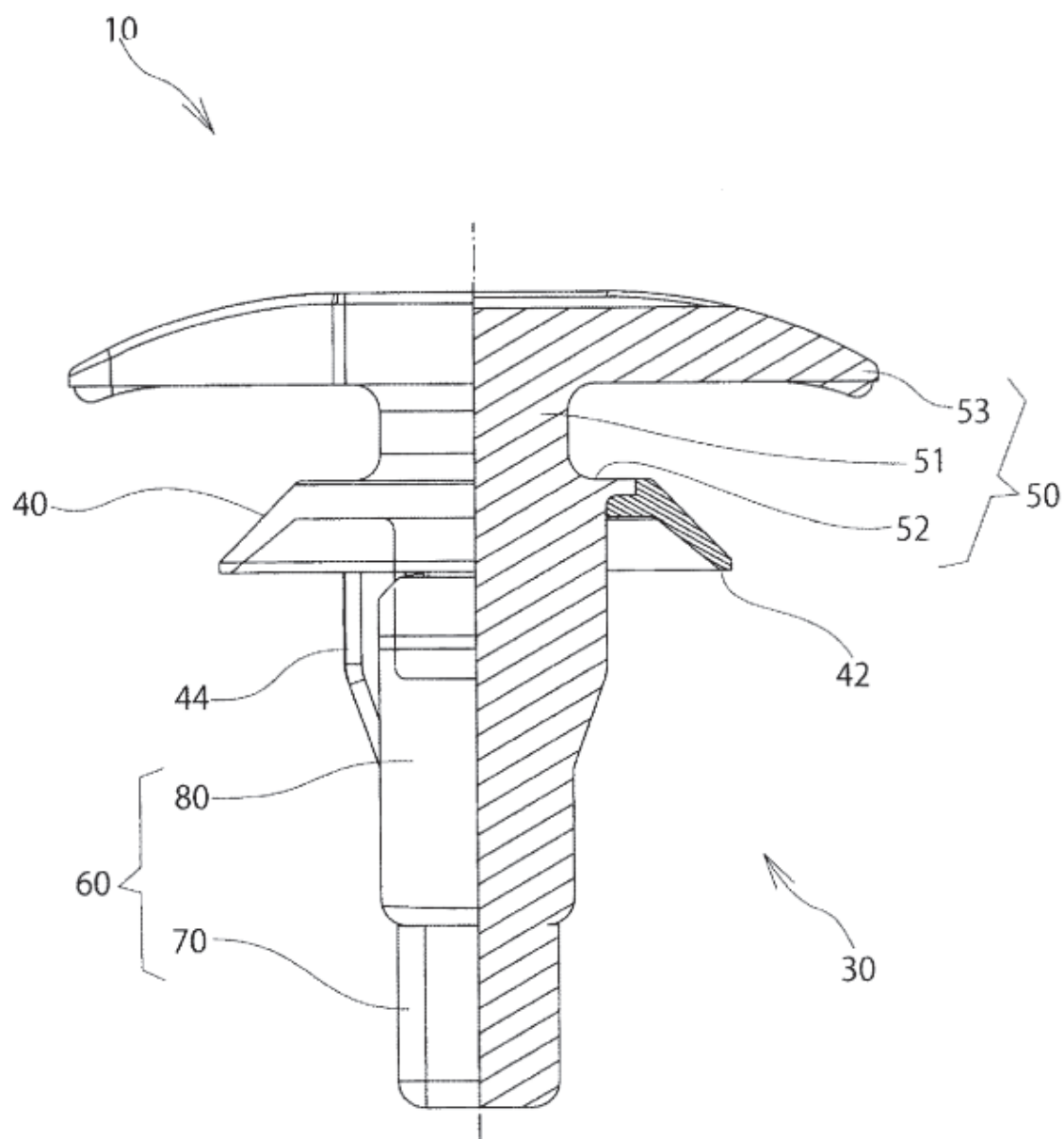
[FIG. 1]



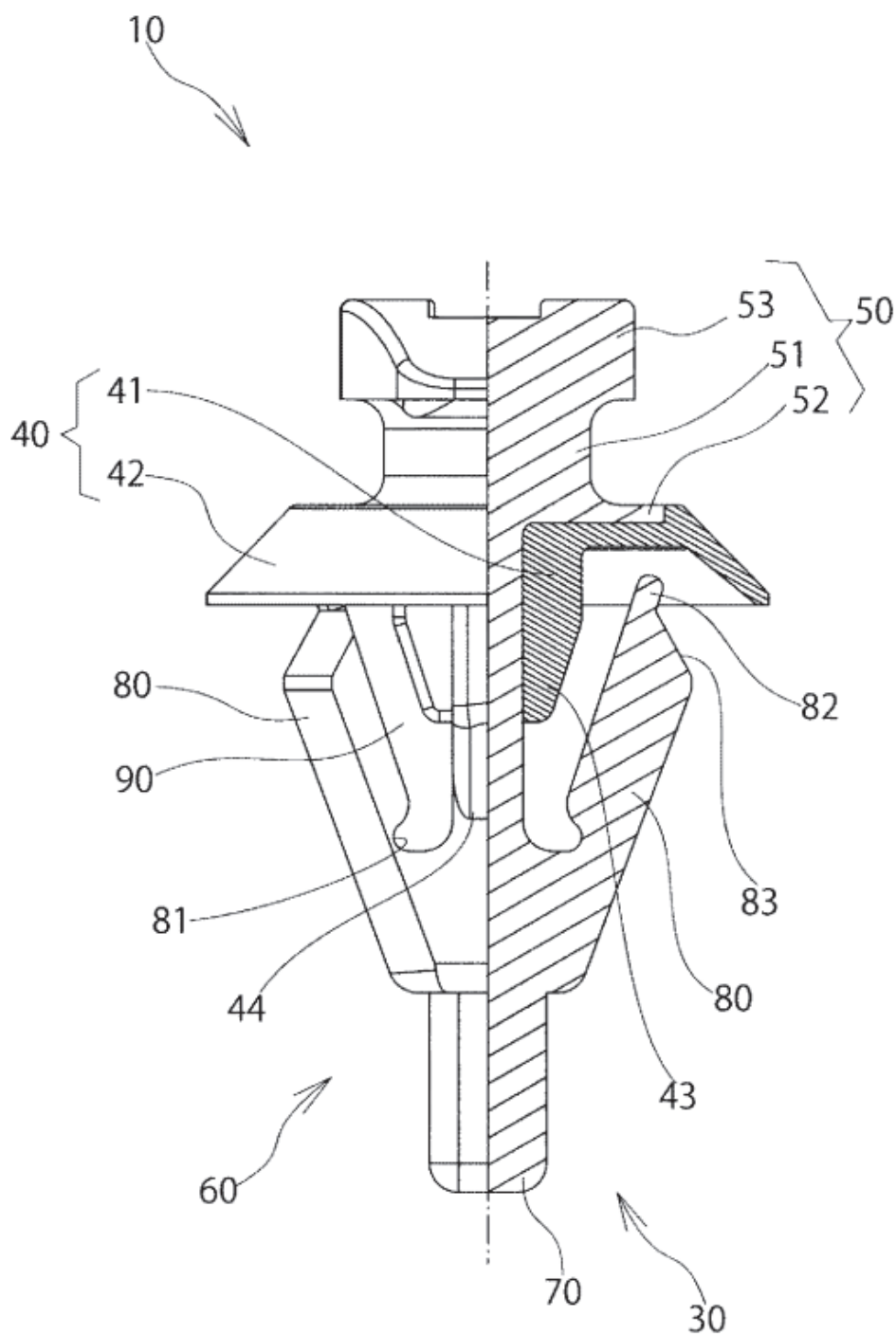
[FIG. 2]



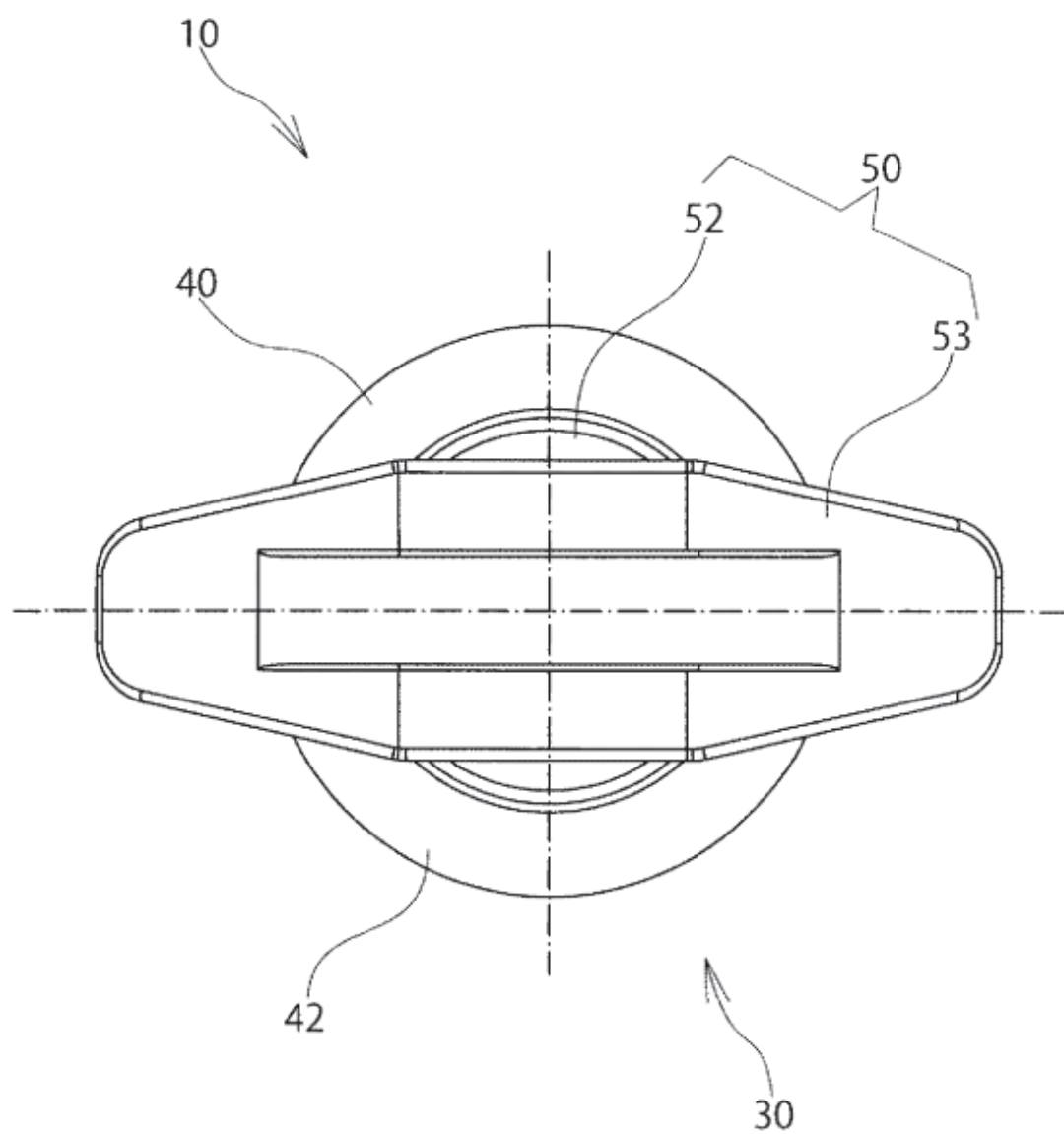
[FIG. 3]



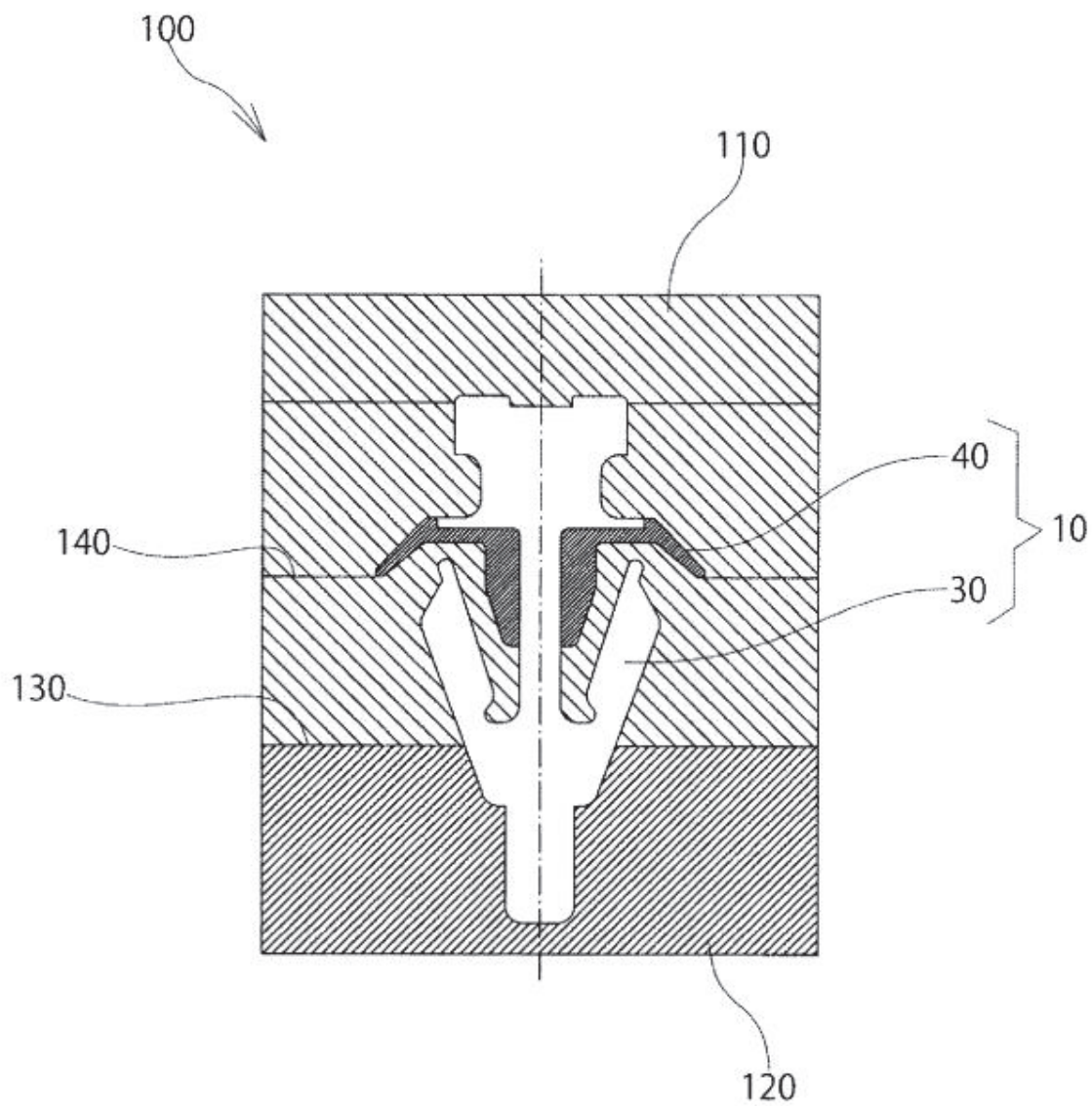
[FIG. 4]



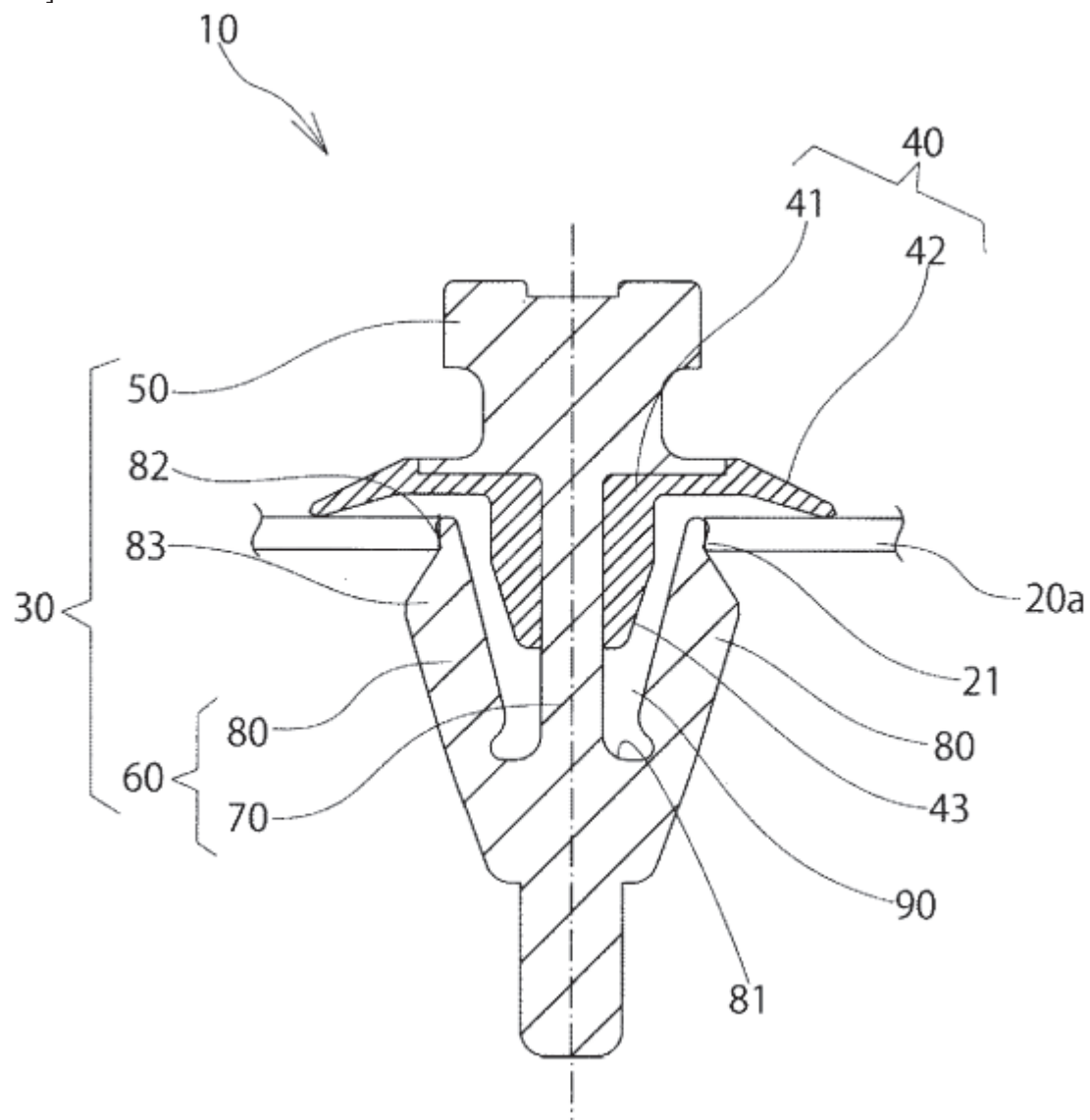
[FIG. 5]



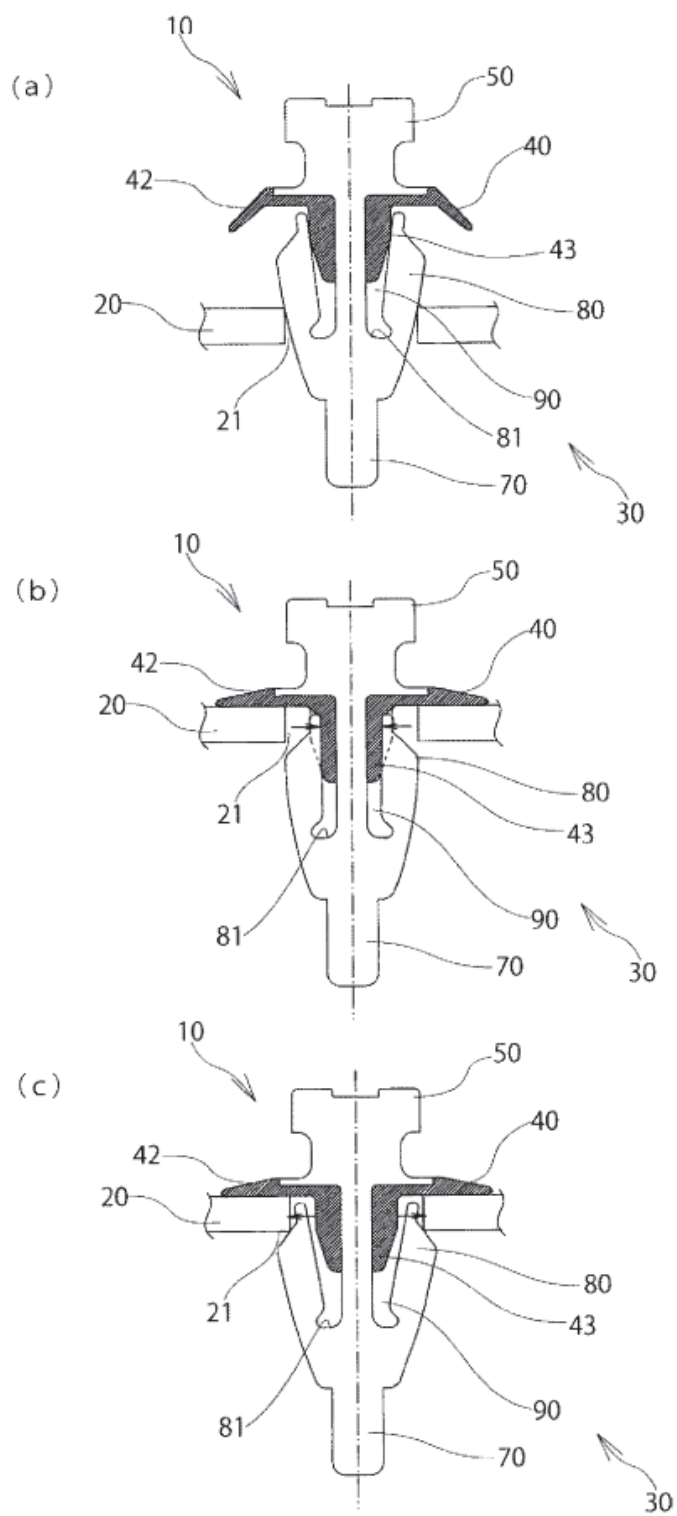
[FIG. 6]



[FIG. 7]



[FIG. 8]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/067485

A. CLASSIFICATION OF SUBJECT MATTER

F16B19/00 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F16B19/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2010
Kokai Jitsuyo Shinan Koho	1971-2010	Toroku Jitsuyo Shinan Koho	1994-2010

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 4-25528 Y2 (Togo Seisakusyo Corp.), 18 June 1992 (18.06.1992), entire text; fig. 1 to 14 (Family: none)	1-4
A	JP 4-32490 Y2 (Nifco Inc.), 05 August 1992 (05.08.1992), entire text; fig. 1 to 7 (Family: none)	1-4
A	JP 5-15607 Y2 (Nifco Inc.), 23 April 1993 (23.04.1993), entire text; fig. 1 to 8 (Family: none)	1-4

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search
12 November, 2010 (12.11.10)Date of mailing of the international search report
22 November, 2010 (22.11.10)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

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Form PCT/ISA/210 (second sheet) (July 2009)

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