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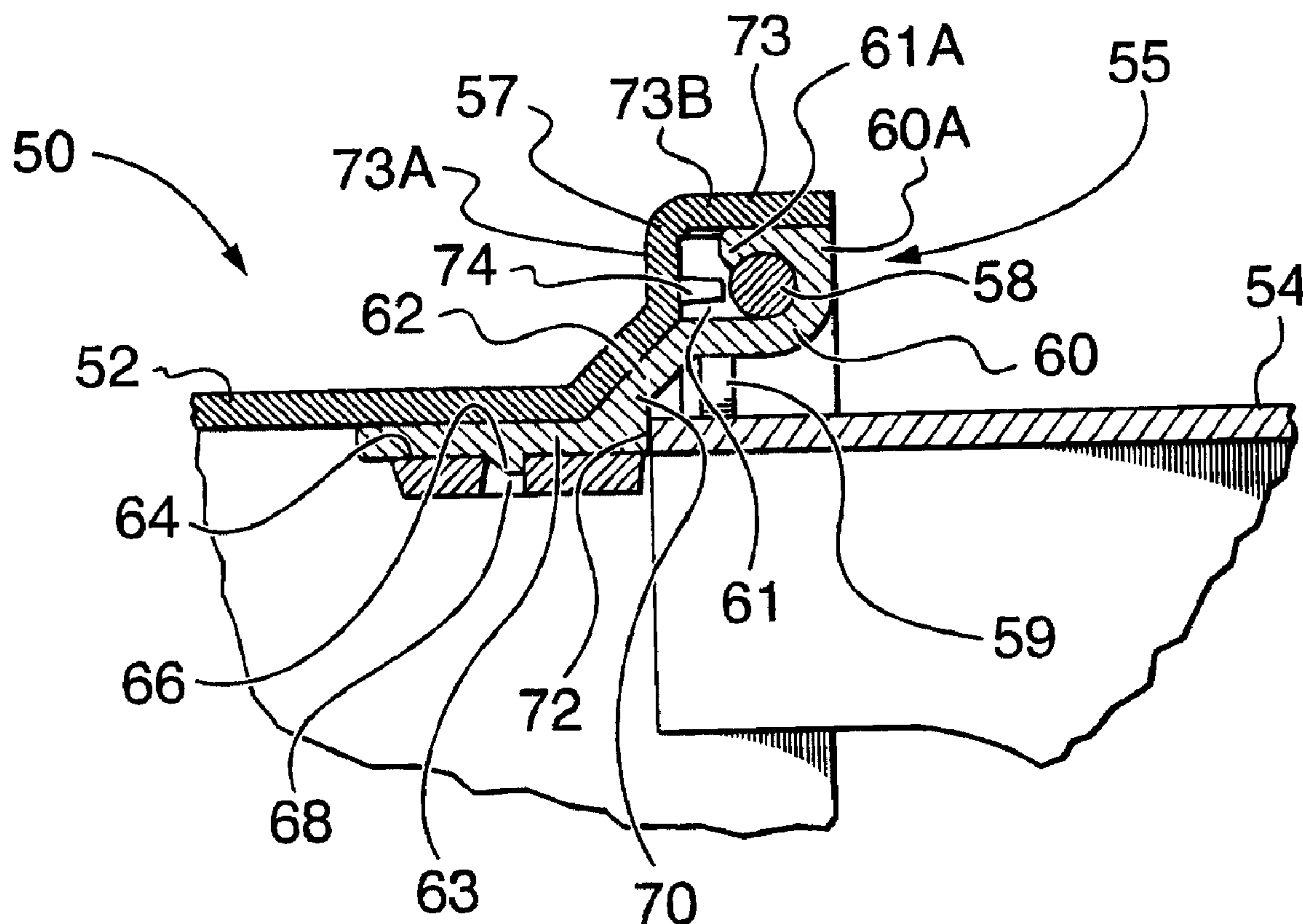
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(54) Title: HIDDEN HINGE



(57) Abrégé/Abstract:

A hidden hinge structure may be injection molded. The hidden hinge structure has a hinge pin attached to a first part and a hook member that is affixed to a second part. A portion of a frontward one of the first and second parts covers the hinge. The hidden hinge may be used to connect the lid and base of a utility enclosure or housing.

Abstract of the Disclosure

5 A hidden hinge structure may be injection molded. The hidden hinge structure has a hinge pin attached to a first part and a hook member that is affixed to a second part. A portion of a frontward one of the first and second parts covers the hinge. The hidden hinge may be used to connect the lid and base of a utility enclosure or housing.

HIDDEN HINGE

Technical Field

[0001] The invention relates to plastic hinges. The invention has application, for example, in attaching the lids of utility enclosures. Utility enclosures (or utility boxes) having hinges according to the invention may be used for housing telephone connections, cable television connections, electrical devices or the like.

Background

10 [0002] Figure 1 shows a hinge 10 of a prior art utility box 12. Box 12 has a base 14 attached to a lid 16 by a hinge 10. Base 14 and lid 16 are made of plastic. Hinge 10 is made up of hinge pins 18, which are molded along one edge of base 14, and holders 20 which grasp hinge pins 18. Each holder 20 comprises a clip 22 which projects inwardly from a lip 24 on lid 16. Hinge pins 18 are received in holders 20 between clips 22 and a back surface portion 26 of lid 16.

[0003] Hinge 10 is a hidden hinge. Lid 16 covers hinge pins 18 when box 12 is closed. Hiding or covering hinge pins 18 is desirable, because it presents a rugged appearance and may deter unauthorized persons from attempting to open box 12. Box 12 has the disadvantage that it can be opened by pulling lip 24 outwardly as indicated by arrow 27 until clips 22 disengage from hinge pins 18. This is a particular problem where box 12 is made from polypropylene, polyethylene or another soft plastic which will bend significantly upon the application of moderate forces.

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[0004] Figure 2 shows a hinge 30 of another prior art utility box 32. Box 32 has a base 34 attached to a lid 36 by hinge 30. Base 34 and lid 36 are injection molded from plastic. Hinge 30 is made up of hinge pins 18, which are molded along one edge of base 34 and hooks 38 which are
5 formed along an edge of lid 36. Hooks 38 extend around hinge pins 18 in a direction from inside to outside.

[0005] Hinge 30 has the disadvantage that it is not a hidden hinge. Hinge pins 18 can be seen from the front when box 32 is closed.
10 Unauthorized persons may be tempted to cut hinge pins 18 or otherwise attack exposed hinge 30 to break into box 32.

[0006] There is a need for robust cost effective hinges for plastic boxes.
15

Summary of the Invention

[0007] This invention provides hinges. One aspect of the invention provides a hidden hinge hingedly connecting first and second parts. The hidden hinge comprises a hinge pin attached to the first part; a hook
20 member connected to the second part and hooked around the hinge pin. The hook member has a bight located on a side of the pin away from the second part. A hiding portion of a frontward one of the first and second parts extends in front of the pin. In some embodiments of the invention, an outer portion of the hiding portion extends rearwardly to cover a side of
25 the pin. In some embodiments the hook member is formed integrally with the second part. In other embodiments the hook member is on a piece separate from the second part and is affixed to the second part.

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[0008] Another aspect of the invention provides a hidden hinge connecting first and second parts. The hidden hinge comprises a hinge pin attached to the first part and a hook member distinct from the second part. The hook member has first and second ends. The hook member comprises
5 a hook on the first end. The hook engages the hinge pin. The second end of the hook member is affixed to the second part. A portion of the second part extends over the hinge pin.

[0009] Another aspect of the invention provides a hidden hinge
10 connecting first and second parts. The hidden hinge comprises a hinge pin attached to the first part and a hook member connected to the second part. The hook member comprises a hook engaging the hinge pin. The hinge comprises a flange extending from the first part to cover a front side of the hinge pin. In some embodiments the flange extends outwardly and
15 rearwardly to cover the hinge pin from both front and side directions.

[0010] Further aspects of the invention and features of specific embodiments of the invention are described below.

20 Brief Description of the Drawings

[0011] In drawings which illustrate non-limiting embodiments of the invention,

Figure 1 is a partial cross sectional view through a hinge of a prior
25 art plastic utility box having a hidden hinge;

Figure 2 is a partial cross sectional view through a hinge of a prior art plastic utility box having an alternative hinge;

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Figure 3 is a partial exploded and partially cut-away view of a plastic utility box having a hidden hinge according to a particular embodiment of the invention;

Figure 4A is a cross section through the Figure 3 hinge in a closed configuration;

Figure 4B is a cross section through the Figure 3 hinge in an open configuration;

Figure 5 is a cross section through a hinge according to an alternative embodiment of the invention;

Figure 6A is a partial isometric view of a first part of a utility enclosure having a hinge as shown in Figure 5;

Figure 6B is a partial isometric view of a second part of a utility enclosure having a hinge as shown in Figure 5;

Figure 7 is a cross section through a hinge according to a further alternative embodiment of the invention; and,

Figure 8 is a cross section through a hinge according to another alternative embodiment of the invention.

Description

[0012] Throughout the following description, specific details are set forth in order to provide a more thorough understanding of the invention. However, the invention may be practiced without these particulars. In other instances, well known elements have not been shown or described in detail to avoid unnecessarily obscuring the invention. Accordingly, the specification and drawings are to be regarded in an illustrative, rather than a restrictive, sense.

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[0013] Various new hinge designs as described herein provide advantages over existing hinges. Some embodiments of the invention provide hidden hinges.

5 [0014] Figures 3, 4A and 4B show a utility box **50** having a lid **52** attached to a base **54** by a hinge **55** according to a particular embodiment of this invention. Hinge **55** comprises one or more hinge pins **58** attached along an edge of base **54** and hooks **60** which hook around hinge pins **58**. A plurality of hinge pins **58** may be axially aligned with one another and
10 molded at spaced-apart locations into a flange **59** projecting outwardly from an edge of base **54**.

[0015] Hooks **60** wrap around hinge pins **58** in an inside-to-outside direction. Hooks **60** are on separate parts **62** which are attached to lid **52**
15 during assembly of box **50**. Hooks **60** have openings **61** to receive hinge pins **58**. When box **50** is closed, a bight **60A** of each hook **60** is on a side of the corresponding hinge pin **58** that faces away from lid **52**. Hooks **60** may include projections **61A** on one or both sides of openings **61**. Projections **61A** snap around hinge pins **58** and help to retain hinge pins
20 **58** engaged in hooks **60**.

[0016] In the illustrated embodiment, a hook **60** is formed on a first end of part **62** and a second end **63** of part **62** is received in a socket **64** formed in lid **52**. When second end **63** is pushed into socket **64**, a
25 projection **66** on second end **63** engages an aperture or indentation **68** in

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an inner wall of socket **64**. This causes second end **63** to become affixed within socket **64**.

[0017] Parts **62** may be affixed to lid **52** by means other than the
5 combination of a projection **66** on a part which engages a socket **64**. Parts **62** may also, or in the alternative, be affixed to lid **52** during assembly of box **50** by any other suitable fastening means, for example, projections which engage sockets, screws, rivets, adhesive, plastic welding, or the like, any of which constitute means for affixing hooks **60** to lid **52**.

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[0018] Lid **52** has a portion **57** which extends over hinge pins **58** when box **50** is closed. In the illustrated embodiment, portion **57** is provided by a flange **73** which extends outwardly from a central part of lid **52** in a portion **73A** and then curves rearwardly into a portion **73B** to
15 cover both front and side aspects of hinge **55** when box **50** is closed.

[0019] In the illustrated embodiment, parts **62** have central portions **70** which offset second ends **63** from hooks **60**. When box **50** is closed, central portions **70** of parts **62** bear against an edge **72** of base **54**.

20

[0020] Box **50** may be assembled by hooking hooks **60** of parts **62** around hinge pins **58** so that second ends **63** of parts **62** project outwardly and central portions **70** bear against and are supported by edge **72**; aligning second ends **63** with corresponding sockets **64**; and then pressing
25 lid **52** into place until second ends **63** are fully engaged in sockets **64** with projections **66** engaging apertures **68**.

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[0021] After box **50** has been assembled, hinge pins **18** are trapped between hooks **60** and lid portion **57**. Pins or other projections **74** may optionally be provided on lid portion **57** to reduce radial play in hinge **55** when hinge **55** is partially or fully open.

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[0022] Figures 5 through 6B show a hinge **80** according to another embodiment of the invention. Hinge **80** hingedly connects a first part **82** with a second part **84**. Parts **82** and **84** could for example, be the lid and base of a box or other enclosure. In the illustrated embodiment, a portion **86** of part **82** substantially covers hinge **80**. Portion **86** comprises a flange having a front portion **86A** which extends over a front-facing part of hinge **80** and a side portion **86B** which extends rearwardly to cover hinge **80** from the side.

10 [0023] Hinge pins **90** are attached to part **82**. Hinge pins **90** may be formed integrally with part **82** or a portion thereof. In the alternative, hinge pins **90** may comprise separate parts which fit into member **82**. For example, in some alternative embodiments hinge pins **90** comprise one or more separate pins pressed longitudinally through holes (not shown) in part **82**. Figure 6A shows one possible arrangement of hinge pins **90** on part **82**. In the embodiment of Figure 6A, hinge pins **90** extend between buttress portions **87**.

[0024] It may be convenient to fabricate part **82**, including hinge pins **90**, by an injection molding process. Where this is done, it may be desirable to provide apertures **94** in hiding portion **86** adjacent to hinge

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pins 90. Apertures 94 can accommodate movable mold sections for use in molding pins 90. Apertures 94 may be left open or may be plugged.

Apertures 94, if present, may be in a forward-facing portion 86A of portion 86 or in side portion 86B of portion 86. In either case, hinge 80 is substantially hidden since hinge pins 90 are not exposed from the front or side of hinge 80. Even if apertures 94 are present, hooks 98 prevent hinge pins 90 from being visible through apertures 94.

[0025] In hinge 80, pins 90 are engaged by hooks 98. Hooks 98 may be formed integrally with part 84. For example, Figure 6B shows a part 84 with integrally molded hooks 98. In the alternative, any suitable attachment means may be provided to attach separate parts which include hooks 98 to part 84. Some suitable attachment means are referred to above in the description of the embodiment illustrated in Figures 3 to 4B. Figure 7 shows a hinge 80A according to an example embodiment of the invention wherein hooks 98A are on separate parts 99 which are affixed to part 84.

[0026] In the embodiment of Figure 5, hooks 98 wrap around the front sides of pins 90 (i.e. around the parts of pins 90 facing toward front part 86A of portion 86). Hooks 98 have openings 101. Part 84 can be hingedly connected to part 82 by inserting pins 90 into openings 101. Preferably openings 101 are slightly narrower than pins 90 so that pins 90 can be snapped into place in hooks 98. In the illustrated embodiment, hooks 98 include projections 103. Projections 103 project into openings 101 and serve to help hold pins 90 engaged in hooks 98.

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[0027] When hinge **80** is in a closed configuration, the bight **97** of each hook **98** is on a side of the corresponding hinge pin **90** which faces away from the part **84** to which hooks **98** are mounted. It can be seen that pulling on part **82** in the direction of arrow **96** will engage pins **90** more
5 tightly into hooks **98**.

[0028] Figure 8 shows a hinge **180** according to another embodiment of the invention. Hinge **180** hingedly connects a first part **182** with a second part **184**. First part **182** is substantially similar to first part **82** of the
10 embodiment illustrated in Figures 5 to 6B. Portion **186** of part **182**, which comprises a flange having front portion **186A** and a side portion **186B**, substantially covers hinge **180**. Hinge pins **190** are attached to part **182** by any of the techniques referred to above in the description of the
embodiment of Figures 5 to 6B.

15

[0029] In hinge **180**, pins **190** are engaged by hooks **198**. Hooks **198** may be formed integrally with part **184**. In the alternative, any suitable attachment means may be provided to attach separate parts which include hooks **198** to part **184**. In the embodiment of Figure 8, each hook **198**
20 comprise an arm **120**, which extends transversely from part **184** and a pair of clasp members **122A**, **122B**, which extend rearwardly from arm **120**. An opening **201** between clasp members **122A**, **122B** allows a corresponding hinge pin **190** to be inserted between clasp members **122A**, **122B** for pivotal movement. Preferably opening **201** is slightly narrower
25 than its corresponding pin **190**, so that pin **190** can be snapped into place in hook **198**.

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[0030] When assembled, a bight portion 197 of each hook 198 wraps around the front side of its corresponding pin 190 (i.e. around the part of pin 190 facing toward front part 186A of portion 186). When hinge 180 is in a closed configuration, the bight 197 of each hook 198 is on a side of the corresponding hinge pin 190 which faces away from the part 184 to which hooks 198 are mounted. It can be seen that pulling on part 182 in the direction of arrow 196 will engage pins 190 more tightly into hooks 198.

10 [0031] Hinges according to the invention may be used to connect two parts for which one of the parts is in front of the other in normal use. For example, a utility enclosure may have a base designed to be attached to a wall, ceiling, or the like and a lid intended to be left exposed. In such cases the lid can be considered to be frontward of the base. The base can
15 be considered to be rearward of the lid. In such cases the rear facing aspect of the hinge is shielded from view by the wall or other surface to which the base of the enclosure is intended to be mounted.

[0032] In all of the hidden hinges described above, a hinge pin is
20 mounted on a first part and a hook is mounted on a second part. It can be seen that the bight of the hook is located on a side of the pin away from the second part, so that when the hinge is in a closed position, pulling the first and second parts apart tends to pull the hinge pin more firmly into the hook. A hiding portion extends in front of the hinge pin from a frontward
25 one of the first and second parts.

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[0033] It can be appreciated that an enclosure according to this invention which incorporates a hinge according to any of the arrangements described above can be made such that side walls of the enclosure's base and lid are in general alignment. For example, in the enclosure shown in
5 Figure 5, side wall **83** of part **82** is in general alignment with side wall **85** of part **84**.

[0034] Where a component (e.g. an assembly, member, part, etc.) is referred to above, unless otherwise indicated, reference to that component
10 (including a reference to a "means") should be interpreted as including as equivalents of that component any component which performs the function of the described component (i.e., that is functionally equivalent), including components which are not structurally equivalent to the disclosed structure which performs the function in the illustrated exemplary embodiments of
15 the invention.

[0035] As will be apparent to those skilled in the art in the light of the foregoing disclosure, many alterations and modifications are possible in the practice of this invention without departing from the spirit or scope
20 thereof. For example:

- Hinge pins **58** are not necessarily formed integrally with base **54**. Hinge pins **58** could be on a separate part which is attached to base **54** in a suitable manner. Hinge pins **58** could be formed of plastic, metal or any other suitable material.
- 25 • The application of the invention is not limited to utility boxes. Hidden hinges according to the invention may be used to attach lids of enclosures of any kind; to attach lids to other structures; or, in

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general, to hingedly attach any two parts where a hinge is desired. Hinges according to the invention are particularly advantageous when the parts of the hinge are formed integrally with the parts which are being hingedly connected by the hinge.

- 5 Accordingly, the scope of the invention is to be construed in accordance with the substance defined by the following claims.

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WHAT IS CLAIMED IS:

1. A hidden hinge comprising:

5 a first part and a second part, the first part located generally forwardly of the second part and the second part located generally rearwardly of the first part;

a hinge pin attached to the first part;

10 a hiding member having a first hiding member portion located forwardly of the hinge pin and extending from a section of the first part located on one transverse side of the hinge pin to an opposing transverse side of the hinge pin and a second hiding member portion which extends rearwardly from the first hiding member portion on the opposing transverse side of the hinge pin and extends from a forward side of the hinge pin to a rearward side of the hinge pin; and

15 a hook member connected to the second part, the hook member hooked around the hinge pin, the hook member extending from a section of the second part located rearwardly of the hinge pin, through a space between the first hiding member portion and the hinge pin, around the hinge pin, and back toward the second part.

2. A hidden hinge according to claim 1 wherein the hook member is formed integrally with the second part.

- 20 3. A hidden hinge according to claim 1 wherein the hook member has an opening smaller than a width of the pin such that the pin snaps into place in the opening of the hook member.

- 25 4. A hidden hinge according to claim 3 wherein the hook is formed integrally with the second part.

- 30 5. A hidden hinge according to claim 3 wherein the hiding member is integrally formed with the first part.

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6. A hidden hinge according to claim 5 wherein the hiding member is penetrated by one or more apertures for facilitating injection molding of the hinge pin rearwardly thereof.
7. A hidden hinge according to claim 1 wherein the hiding member is integrally formed with the first part.
8. A hidden hinge according to claim 7 wherein the hiding member is penetrated by one or more apertures for facilitating injection molding of the hinge pin rearwardly thereof.
9. A hidden hinge according to claim 1 wherein the first hiding member portion blocks access to the hinge pin and the hook member from the forward side of the hinge pin.
10. A hidden hinge according to claim 1 wherein the second hiding member portion blocks access to the hinge pin and the hook member from the opposing transverse side of the hinge pin.
11. A hidden hinge comprising:
- a first part and a second part, the first part located generally rearwardly of the second part and the second part located generally forwardly of the first part;
 - a hinge pin attached to the first part;
 - a hiding member having a first hiding member portion located forwardly of the hinge pin and extending from a section of the second part located on one transverse side of the hinge pin to an opposing transverse side of the hinge pin to thereby conceal the hinge pin from view from a forward side thereof; and
 - a hook member connected to the second part, the hook member extending from a section of the second part located forwardly of the hinge pin, around the hinge pin, and back toward the second part;
- wherein the hook member is on a piece separate from the second part, the piece comprising a first portion which is affixed to the second part.

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12. A hidden hinge according to claim 11 wherein the first portion of the piece is affixed within a socket on the second part.
13. A hidden hinge according to claim 12 wherein the first part comprises a base of a box and the second part comprises a lid of the box.
14. A hidden hinge according to claim 13 wherein the hook member is on a second portion of the piece and the hook member is offset from the first portion of the piece in a direction transverse to the rearward and forward directions.
15. A hidden hinge according to claim 14 wherein the base comprises an edge and the piece comprises a central portion and wherein the base and the lid are moveable to a closed configuration in which the central portion of the piece engages the edge of the base.
16. A plurality of hidden hinges according to claim 15 wherein the hinge pins of the plurality of hinges are axially aligned with and spaced apart from one another.
17. A plurality of hidden hinges according to claim 16 wherein the hinge pins are molded into one or more flanges extending from the edge of the base.
18. A hidden hinge according to claim 13 wherein the first hiding member portion comprises a flange projecting outwardly from a central portion of the lid, the central portion of the lid located away from an edge of the lid.
19. A hidden hinge according to claim 18 wherein the flange extends circumferentially around at least a portion of the hook member.

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20. A hidden hinge according to claim 19 wherein the socket is in the central portion of the lid.
- 5 21. A hidden hinge according to claim 12 wherein the first portion of the piece comprises a projection from a surface thereof, which projection projects into one of: an aperture in a wall of the socket and an indent in the wall of the socket.
- 10 22. A hidden hinge according to claim 11 wherein the hiding member comprises a second hiding member portion which extends rearwardly from the first hiding member portion on the opposing transverse side of the hinge pin to thereby conceal the hinge pin from view from the opposing transverse side thereof.
- 15 23. A hidden hinge according to claim 22 wherein the hook member extends around the hinge pin for at least 180 degrees.
- 20 24. A hidden hinge according to claim 23 wherein the hook member is deformable and has an opening smaller than a width of the pin such that the hinge pin snaps into place in the hook member after being inserted through the opening.
- 25 25. A hidden hinge according to claim 22 wherein the first portion of the piece is affixed within a socket on the second part.
26. A hidden hinge according to claim 25 wherein the first portion of the piece comprises a projection from a surface thereof, which projection projects into one of: an aperture in a wall of the socket and an indent in the wall of the socket.
27. A hidden hinge according to claim 25 wherein the first part comprises a base of a box and the second part comprises a lid of the box.

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28. A hidden hinge according to claim 27 wherein the hook member is on a second portion of the piece and the hook member is offset from the first portion of the piece in a direction transverse to the rearward and forward directions.

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29. A hidden hinge according to claim 28 wherein the base comprises an edge and the piece comprises a central portion and wherein the base and the lid are moveable to a closed configuration in which the central portion of the piece engages the edge of the base.

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30. A plurality of hidden hinges according to claim 29 wherein the hinge pins of the plurality of hinges are axially aligned with and spaced apart from one another.

31. A plurality of hidden hinges according to claim 30 wherein the hinge pins are molded into one or more flanges extending from the edge of the base.

15

32. A hidden hinge according to claim 22 wherein the hook member is deformable and has an opening smaller than a width of the hinge pin such that the hinge pin snaps into place in the hook member after being inserted through the opening.

20

33. A hidden hinge according to claim 11 wherein the hook member is is deformable and has an opening smaller than a width of the hinge pin such that the hinge pin snaps into place in the hook member after being inserted through the opening.

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34. A hidden hinge according to claim 11 wherein the hiding member is separate from the second part and is affixed to the second part.

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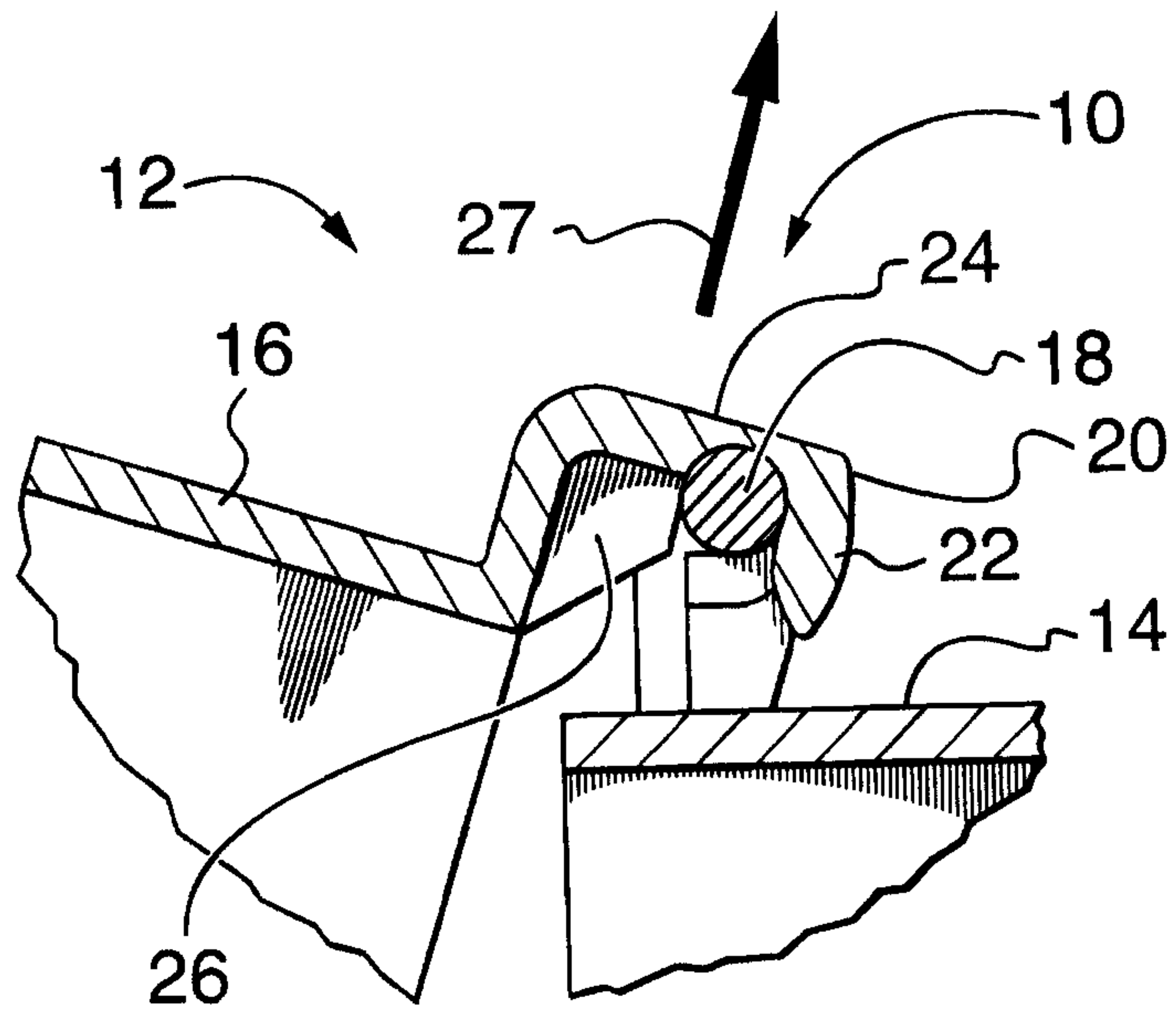


FIG. 1
PRIOR ART

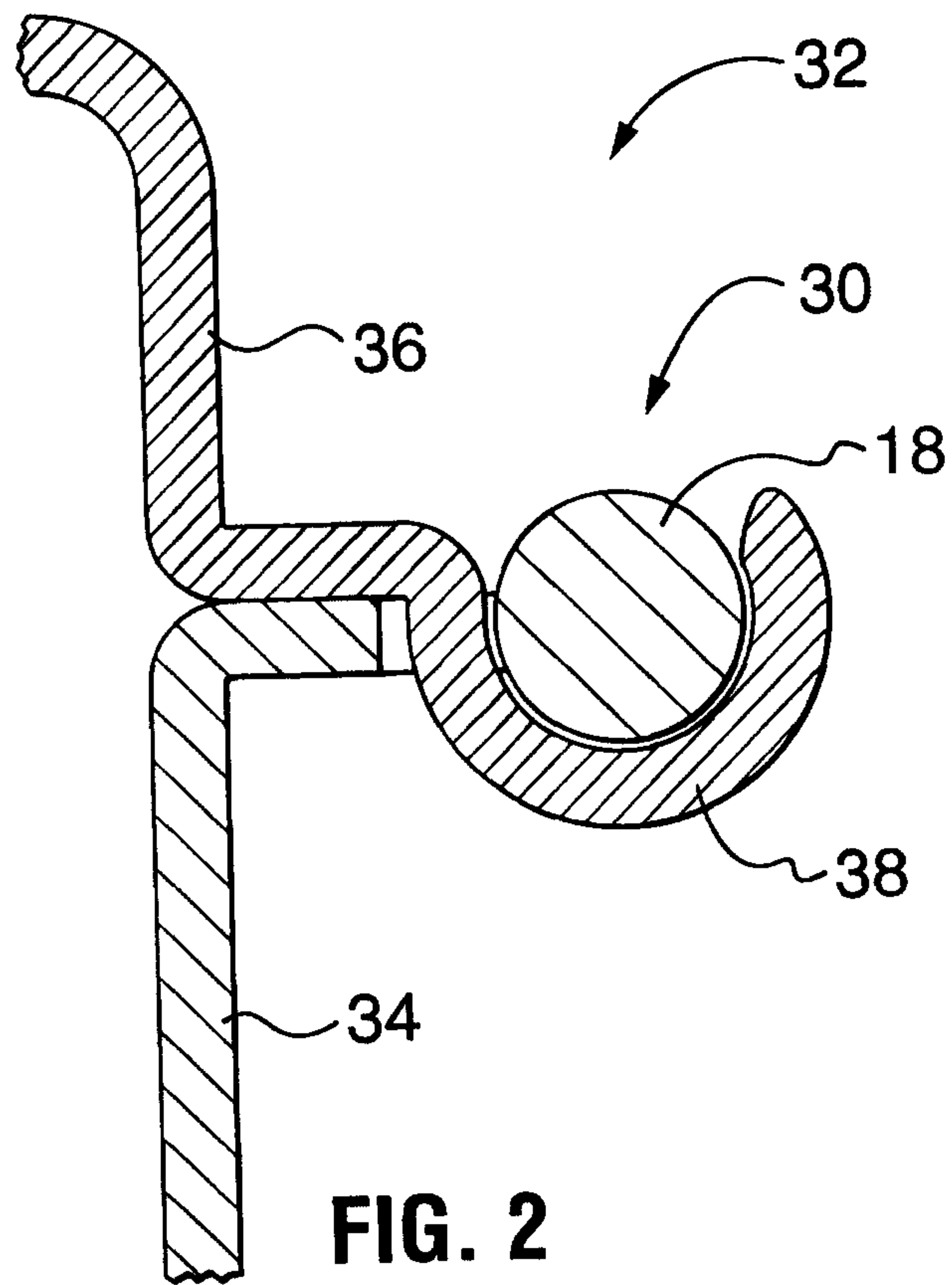
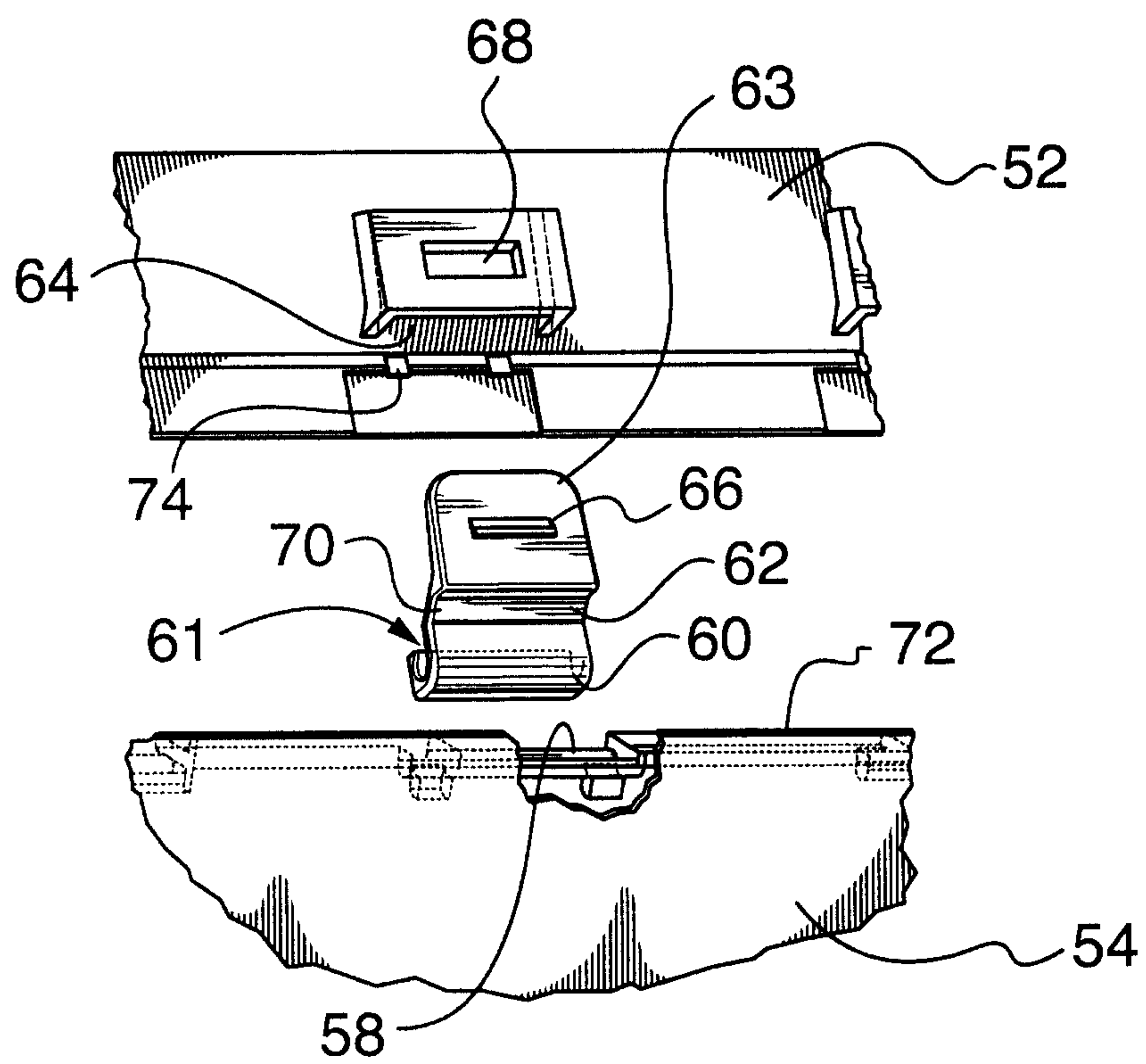
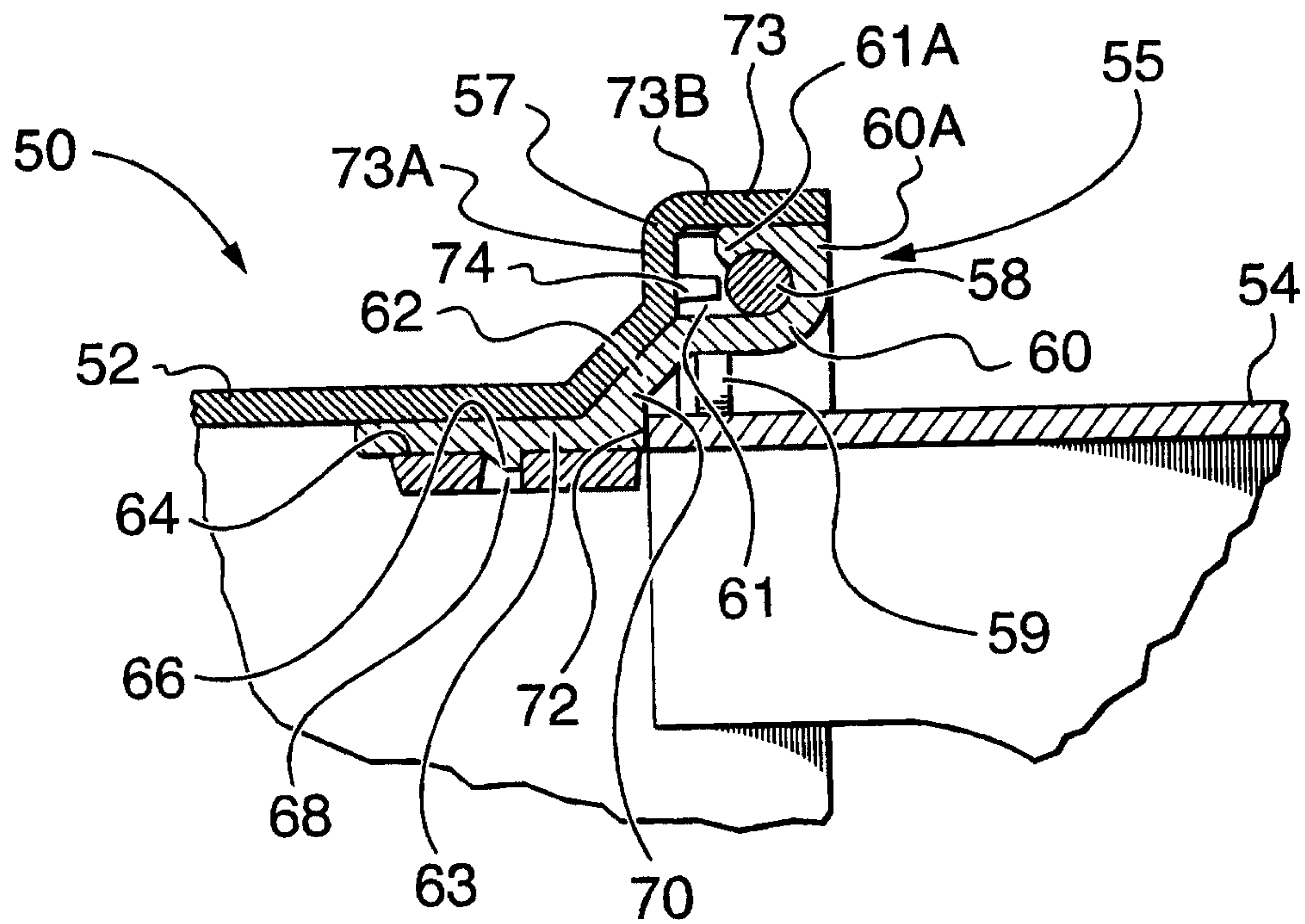
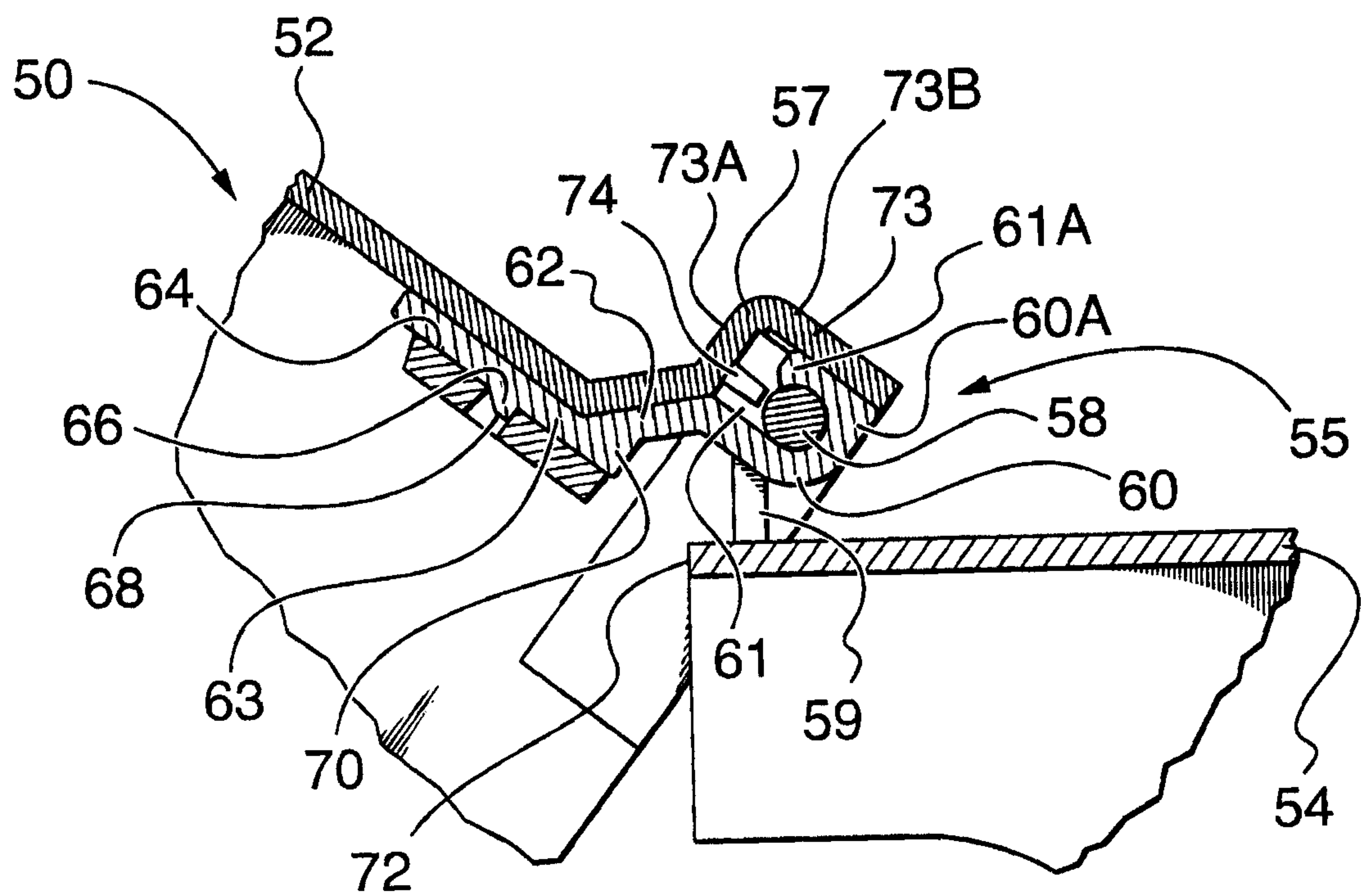


FIG. 2
PRIOR ART

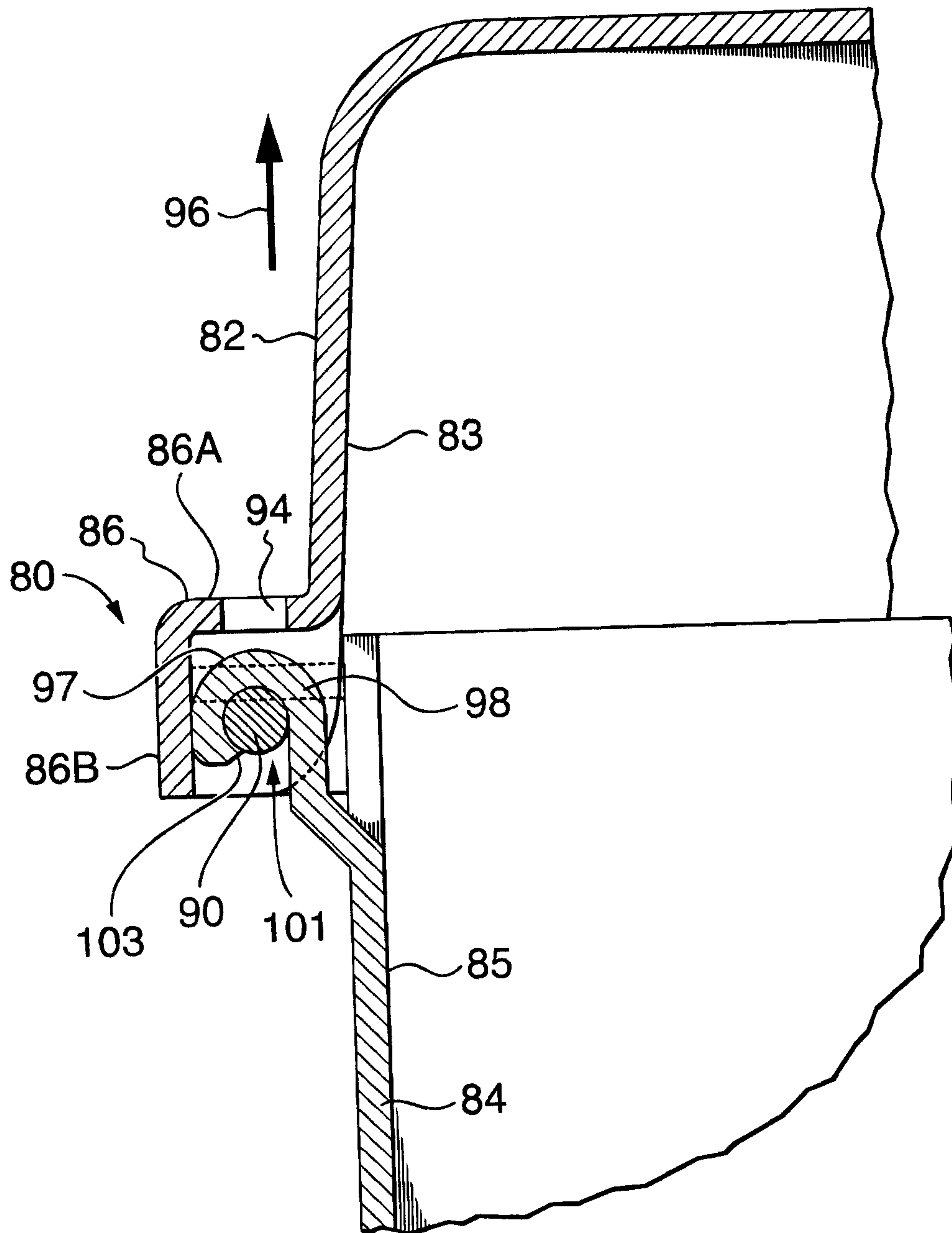
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**FIG. 3**

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**FIG. 4A****FIG. 4B**

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**FIG. 5**

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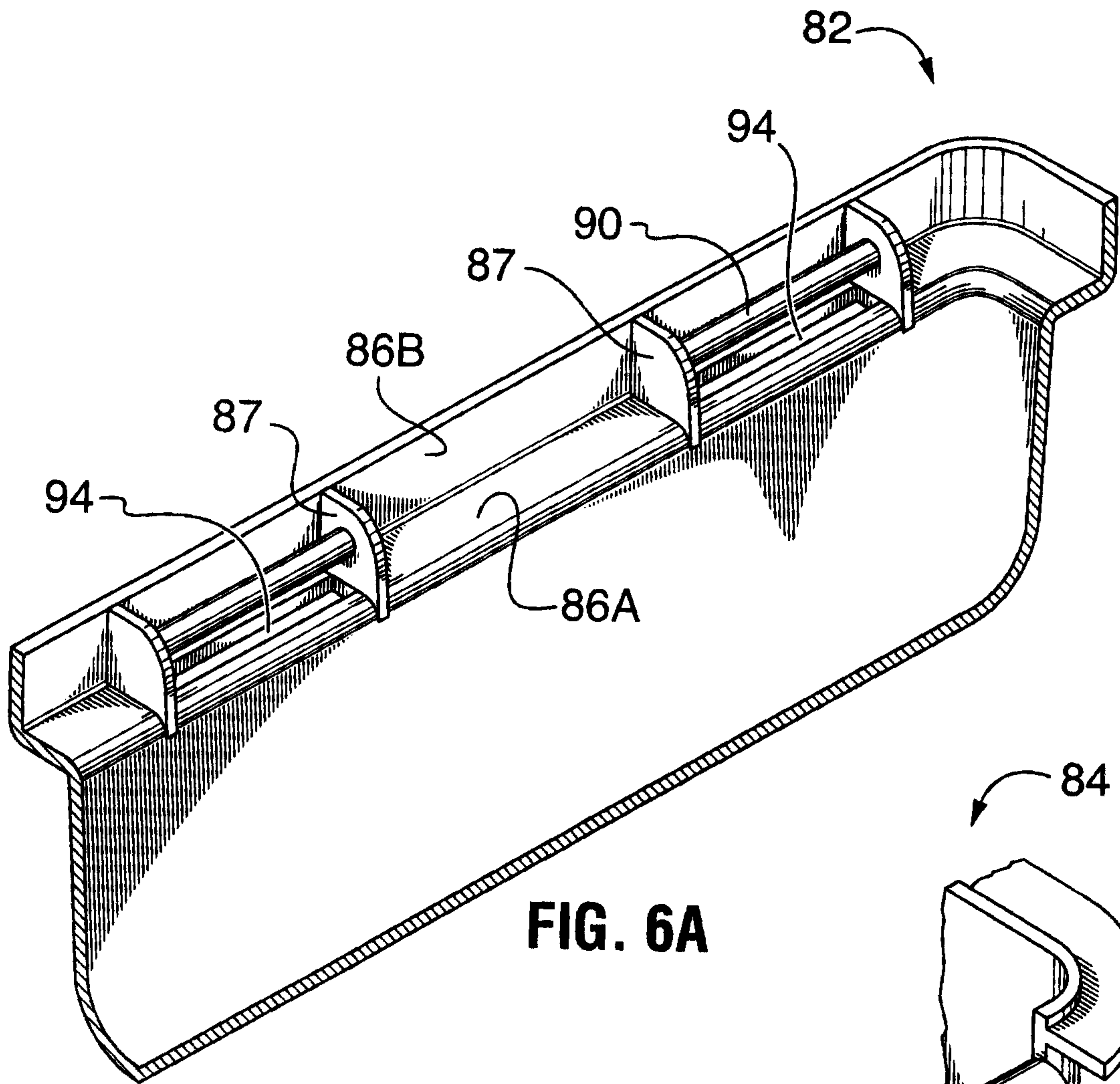


FIG. 6A

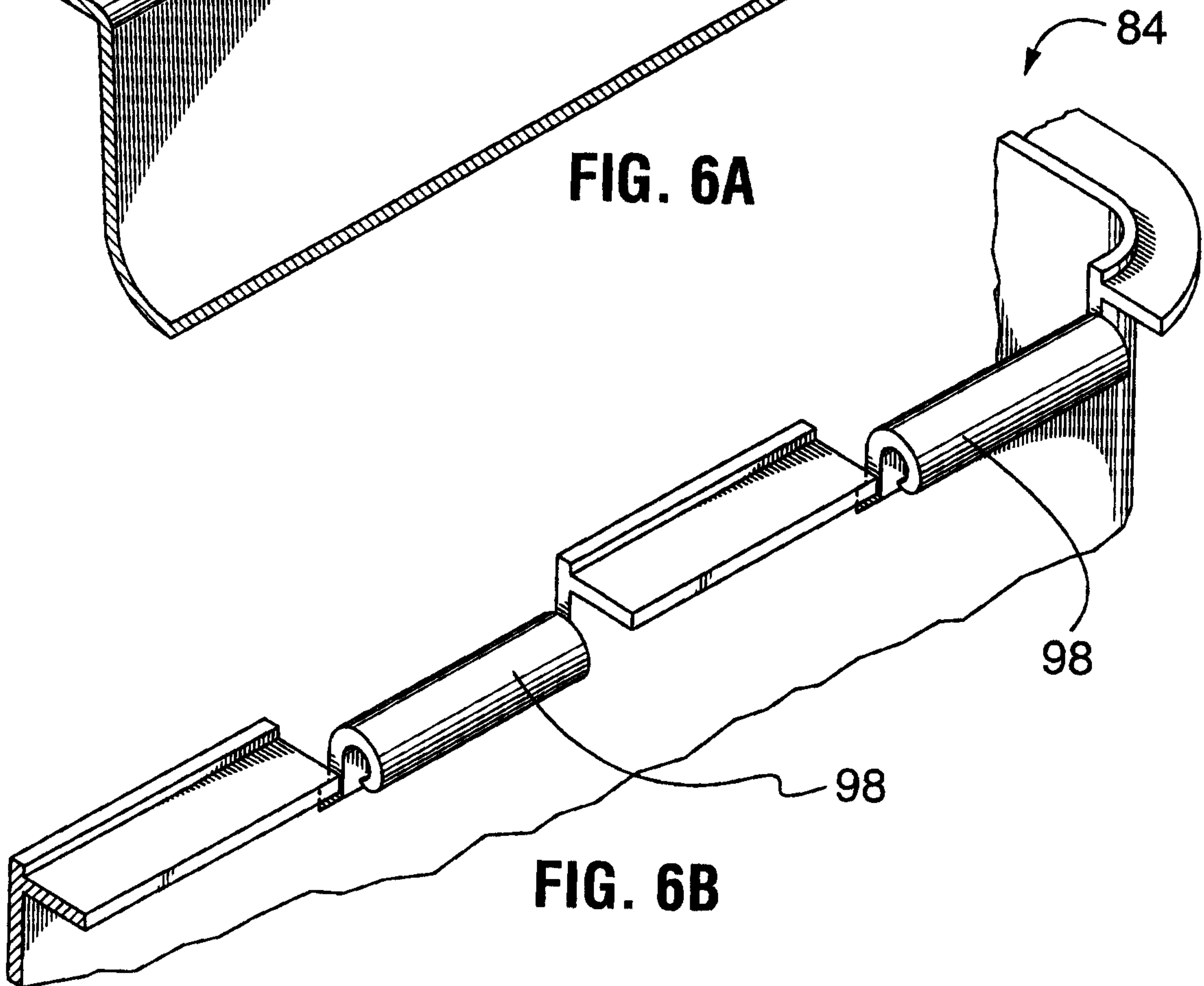
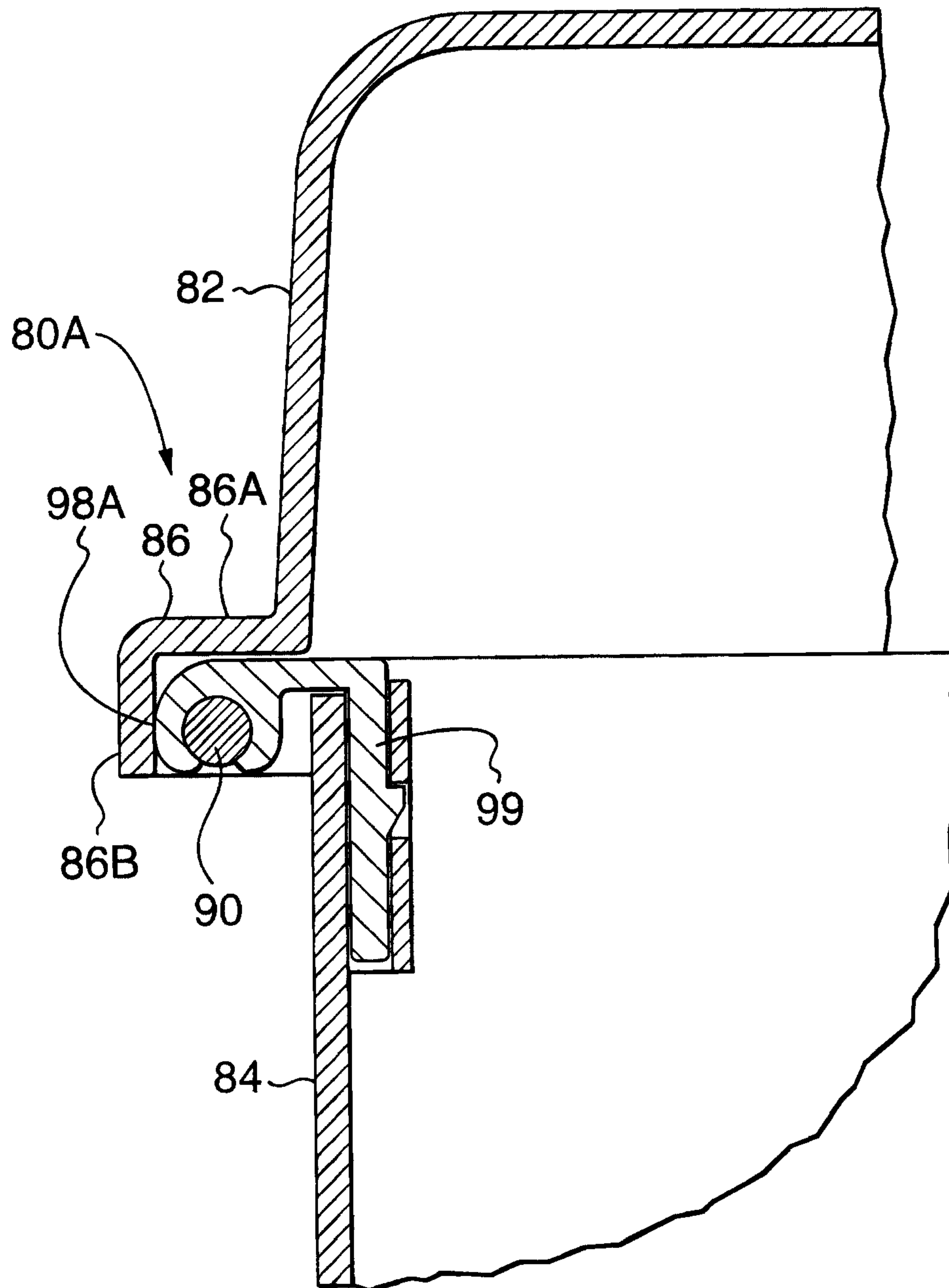
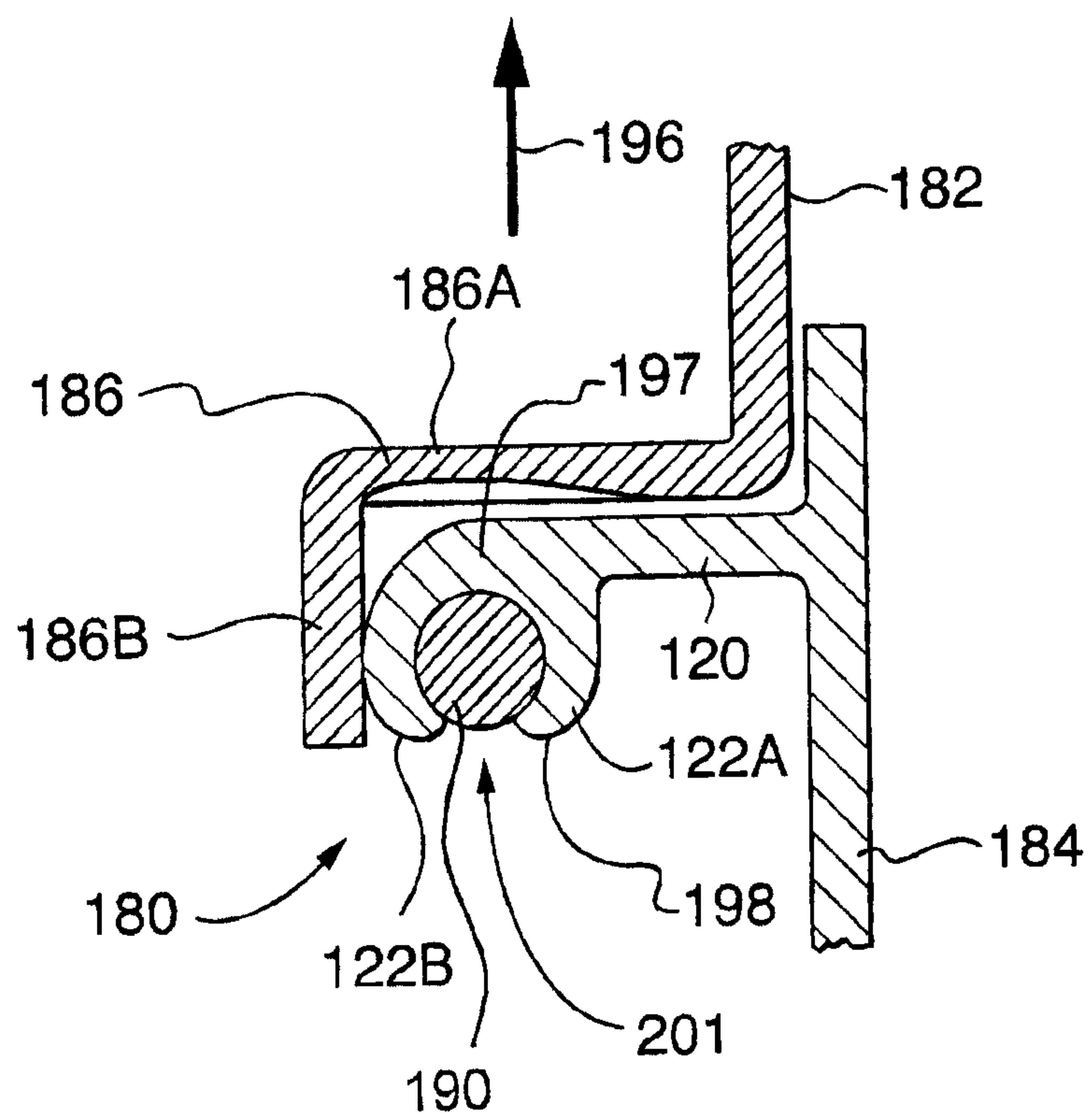


FIG. 6B

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**FIG. 7**

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**FIG. 8**

