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Ksiezopolski

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- (54) **EDGE SEAL WITH SIDEWALL SEAL**
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B60R 13/06 (2006.01)

(52) **U.S. Cl.**
CPC . **B60R 13/06** (2013.01); **B60P 3/34** (2013.01);
B60P 3/34I (2013.01)

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CPC B60P 3/34; F21Y 2103/00; B60J 10/0031; B60J 10/08; B60J 10/0062; Y10T 29/49622; B60R 13/06; E02F 9/163; E05Y 2900/518
USPC 296/26.13, 165, 171, 175, 26.11, 26.12, 296/164, 26.01, 26.09
See application file for complete search history.

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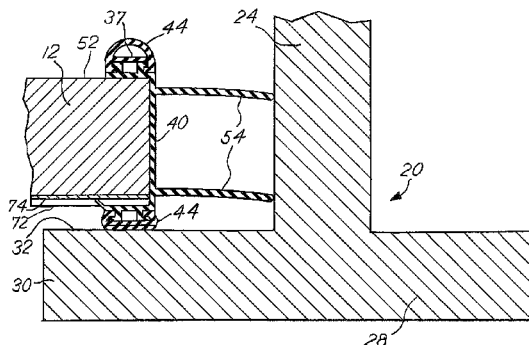
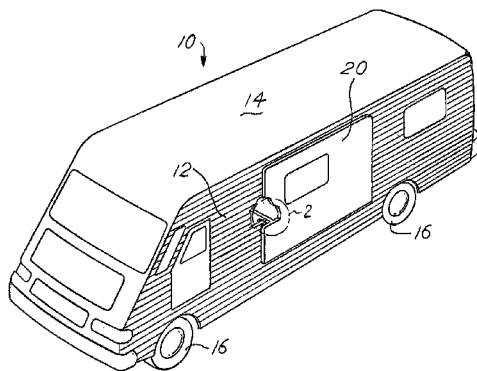
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(57) **ABSTRACT**

A resilient seal for mobile living quarters around a slide out room that includes a pair of mounting portions extending along the inside and outside surfaces of the main living area wall at an aperture through which the slide out room moves and further includes a connecting member extending between the attaching members and along the edge of the wall defining the aperture. The seal includes a flexible protrusion that can conform to an irregular surface or for accommodating walls of different thicknesses. A wiper seal extends from the connecting member to flex against the walls of the slide out room.

16 Claims, 4 Drawing Sheets



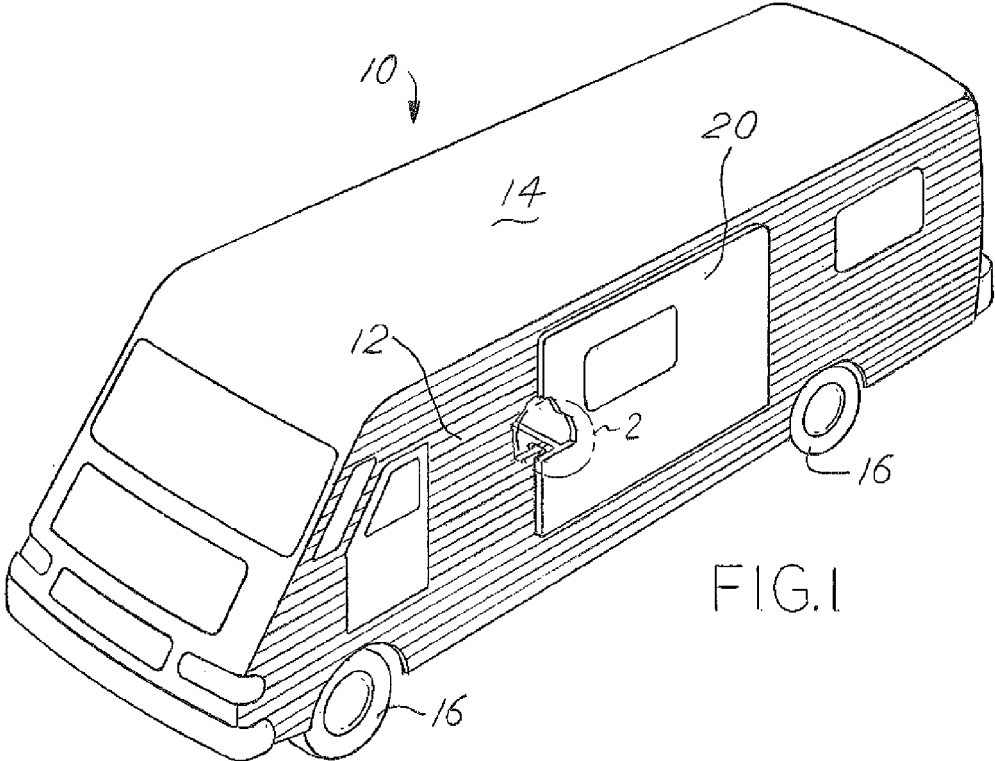


FIG. 1

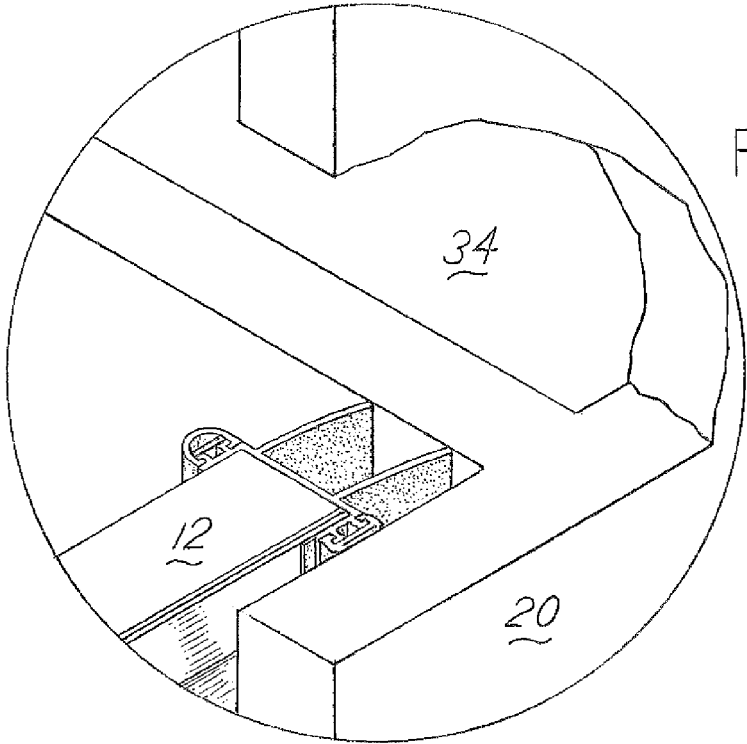
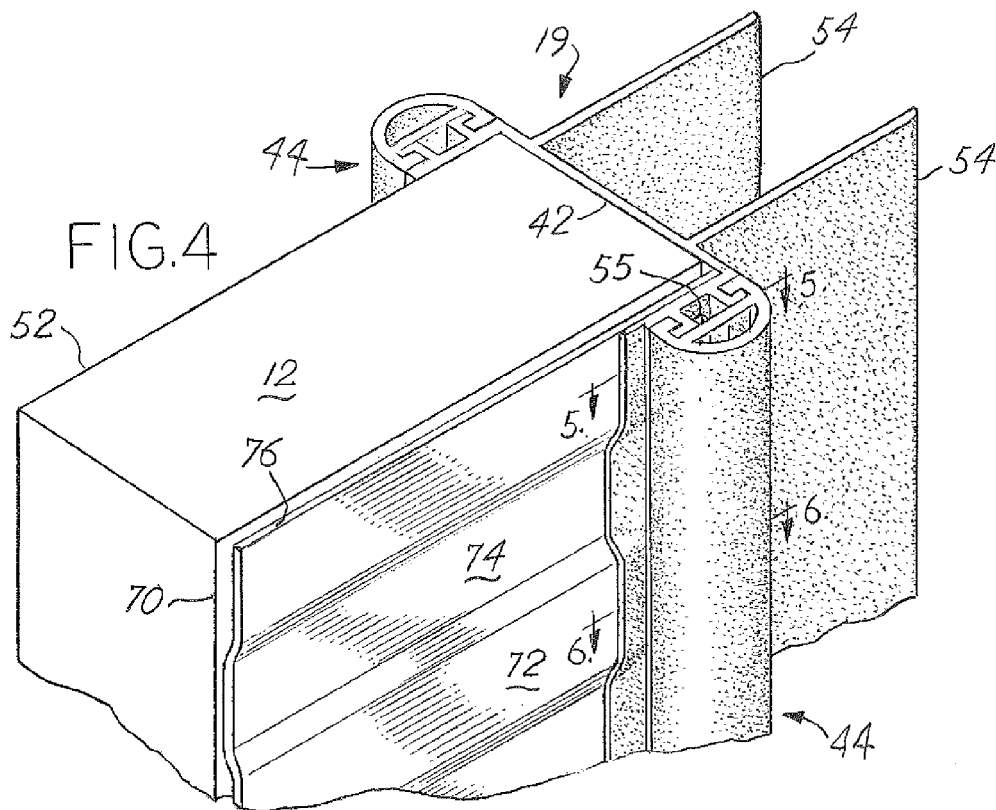
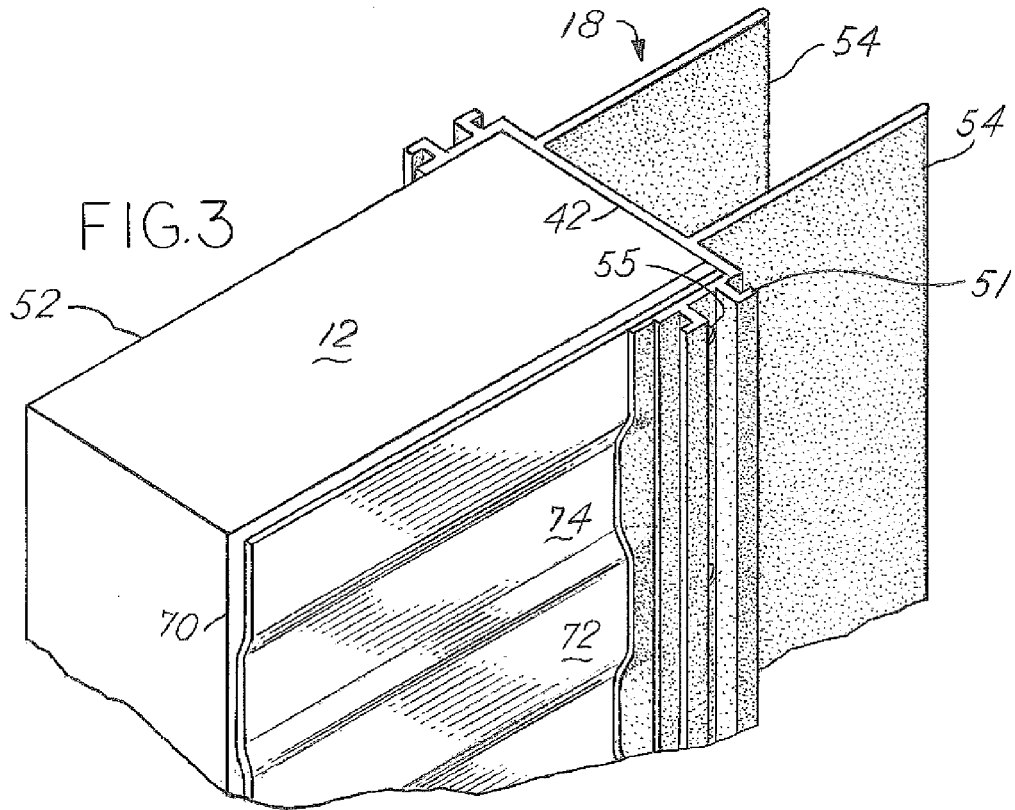
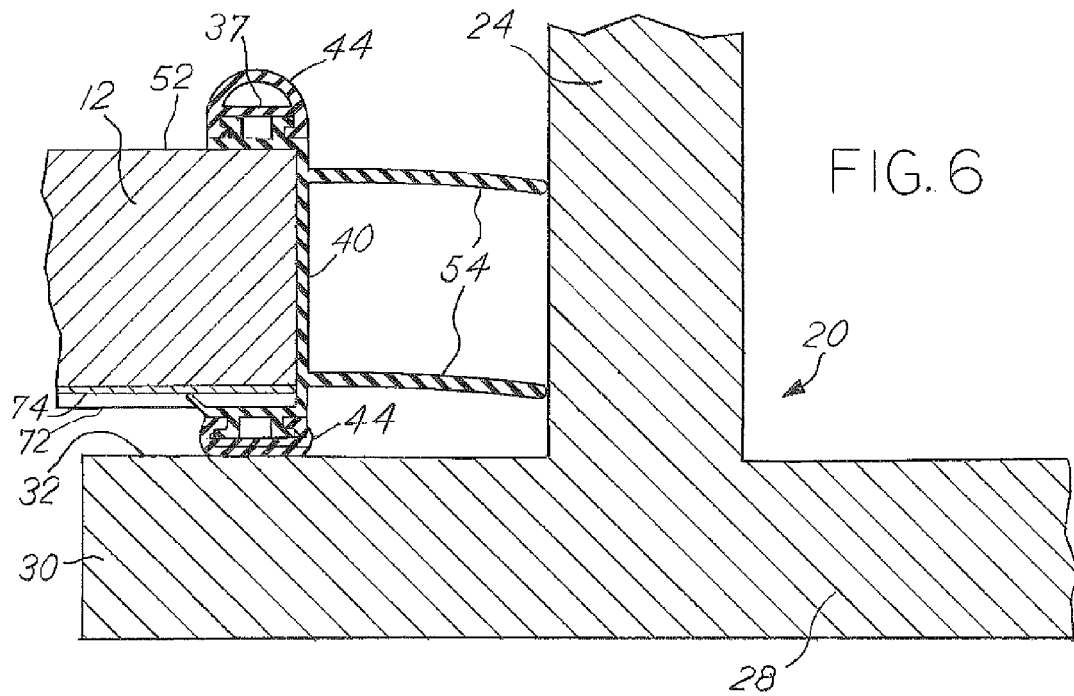
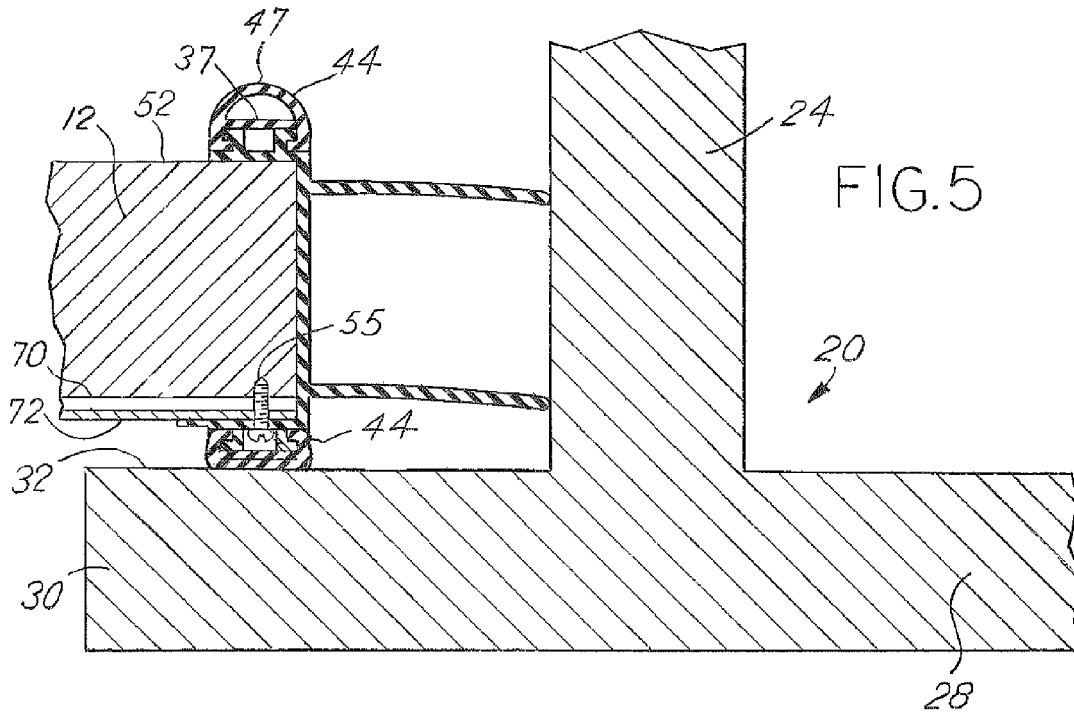
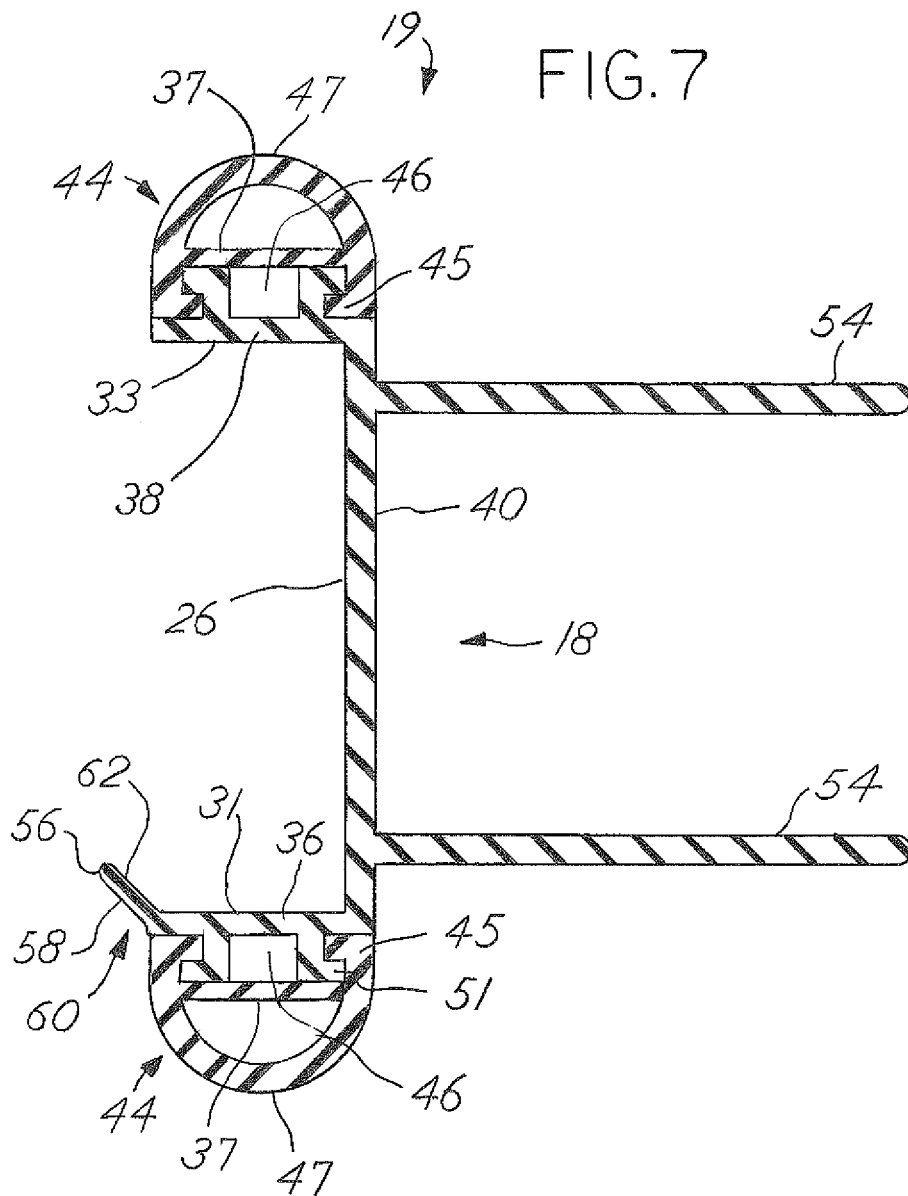


FIG. 2







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EDGE SEAL WITH SIDEWALL SEAL**CROSS REFERENCE TO RELATED APPLICATIONS**

This application is a continuation of and claims the benefit of priority from the prior U.S. patent application Ser. No. 14/242,002, filed Apr. 1, 2014, the entire contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Recreational vehicles such as motor homes and travel trailers are commonly equipped with one or more slide out rooms that are retracted within the main living quarters when the unit is transported, but can be extended from the main living quarters to provide auxiliary space when the unit is parked. Commonly, bulb seals extend around the aperture defined in the outside of the sidewall of the main living quarters through which the slide out room extends and retracts. This seal is engaged by a first flange on the exterior side of the slide out room to seal the gap between the slide out room and the main living quarters when the slide out room is retracted. Similarly, a second bulb seal extends around the aperture on the inside of the sidewall and is engaged by a second flange on the interior side of the slide out room when the slide out room is extended for use. Wiper seals are mounted on sidewalls adjacent to the aperture and are flexed against corresponding walls of the slide out room. The bulb seals seal the slide out room in the extended and retracted positions, and the wiper seal wipes against the slide out room as it is extended and retracted to prevent moisture and debris from entering the vehicle. While the seals of the aforementioned patents accomplished their task successfully, there were issues with sealing to an outside wall that is ribbed or patterned. Seals are most inexpensively produced from a single extrusion, making a cross sectional shape relatively easy, but lengthwise features nearly impossible. Affixing a seal to the non-movable part of the room meant additional sealing compound needed to be added to fill in gaps between the seal and the mounting surface. Ideally, a single seal installed without additional steps or materials would simplify installation.

SUMMARY OF THE INVENTION

According to the invention, a resilient seal for mobile living quarters is provided for sealing around a slide out room of mobile living quarters having an aperture slidably receiving a slide out room. The resilient seal has a pair of attaching members extending along the inside and outside surfaces of the main living area wall at the aperture and further include a connecting member extending between the attaching members and along the edge of the wall defining the aperture. A flipper extends from an attaching member such that the seal maintains contact with different thicknesses of the main living quarter walls. The flipper flattens out with a thicker portion of the wall, and it extends inwardly to meet up with a thinner portion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the RV;

FIG. 2 is a magnified view of area 2 in FIG. 1;

FIG. 3 is a perspective view of the seal base installed on a sidewall;

FIG. 4 is a perspective view of the seal structure fully installed on a sidewall;

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FIG. 5 is a section view 5-5 of the seal shown in FIG. 4 with the slide out room refracted;

FIG. 6 is a section view 6-6 of the seal shown in FIG. 4 with the slide out room refracted; and

5 FIG. 7 is a section view of the seal without the sidewall.

DETAILED DESCRIPTION OF INVENTION

Referring now to the drawings, mobile living quarters, such as the recreational vehicle generally indicated at 10, includes side walls 12 and a ceiling wall 14. The mobile living quarters shown in all FIGS is a recreational vehicle, but can apply to trailers or other spaces where a movable section is desired. The mobile living quarters 10 is mounted on wheels 16 for transport. An aperture is provided in one of the side walls 12 and slidably receives a slide out room 20. This is best seen in the magnified view shown in FIG. 3. The side walls 12 and ceiling wall 14 cooperate to define a main living area. The slide out room 20 includes side walls 24, a ceiling wall, and a front wall 28. As known to those skilled in the art, the slide out room 20 is mounted for movement through the aperture, so that it may be retracted into the main living quarters 22 as is shown in FIG. 1 when the unit is transported, but can be extended from the main living quarters when the unit is parked, thereby providing auxiliary living space. The slide out room 20 includes an exterior flange 30 extending around the side walls 24 and ceiling wall. The exterior flange 30 has an inside surface 32 designed to mate with a seal assembly 19. The slide out room 20 includes another flange, being an interior flange (not shown), extending around the side walls 24 and ceiling wall at the ends thereof opposite the ends joined to the front wall 28. The side walls 24, ceiling wall, and front wall 28 cooperate to define an auxiliary living area 34 FIG. 2, which is available for use when the unit is parked and the slide out room 20 is moved to the extended position.

The sidewall 12 can either be smooth or corrugated. In the RV shown in FIGS. 1-4, the exterior surface of the sidewall is made from corrugated metal 76. The corrugated metal 75 has a proud surface 72 and a recessed surface 74. As shown in FIGS. 3 and 4, the corrugated metal 75 is affixed to the outside of the sidewall 12 and mated to the outer surface 70 of the wall 12.

It is necessary to assure that moisture, dirt, debris, etc. be prevented from entering the living quarters. In FIG. 3 a seal base 18 is installed around the inside perimeter 42 to the aperture and bulb seals 44 are subsequently added to form a seal assembly 19. The seal assembly 19 must provide sealing at the extended position, retracted position, and all intermediate positions. The seal assembly 19 includes bulb seals 44 mounted around the aperture on the exterior surface and the interior surface of the side wall 12 adjacent the aperture, and wiper seals 54 engage the side walls 24 and ceiling wall 26 of the slide out room to wipe against the walls as the slide out room 20 extends and retracts. Preferably, the seal base 18 and bulb seals 44 are made continuously through an extrusion process and is consistent along its entire length, so that an appropriate length can be cut off and installed.

FIG. 4 shows the seal assembly 19 in perspective as it is assembled onto a sidewall 12. The seal base 18 has a pair of mounting portion attachment members 36, 38, which are connected by a longitudinal connecting member 40, which extends over the transverse edge 42 FIG. 3 of the sidewall 12. The exterior mounting portion 36 has a mounting surface 31 and the interior mounting portion 38 has a mounting surface 33. The mounting portions 36, 38 include oppositely extending, rail-like outwardly facing tabs 51 which form a tongue. A clip part of the bulb seal 44 includes tabs 45 which form an

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inwardly facing groove defined by the tabs **45**. When the mounting portions **36, 38** and clip part are connected together, the tongues fit into grooves as is shown in FIG. 7. The tabs **45** all extend lengthwise along the bulb seal **44** such that, once fitted together, the bulb seal **44** may be slid along the length of the mounting portion, and are flexible enough to allow them to snap past each other for assembly. It contemplates that the orientation of the tongue and groove can be reversed so that the tongue is on the bulb seal **44** and the groove is on corresponding mounting portions **36, 38**. Alternatively, the clip part of the bulb seal portion may be slid into a mounting portion from an end of the seal. Preferably, the bulb seal is constructed such that tabs **45** are more rigid than the wall **47**. The bulb seals **44** have a wall **47** that is arcuately shaped. The wall **47** has a consistent thickness as is shown in FIG. 7. The bulb seal **44** has an internal web **37** that connects opposing sides of the wall **47** and is adjacent to the tongue **45**. The web **37** prevents the opposing sides of the bulb seal **44** from separating, especially when the bulb seal **44** is compressed against a surface such as inside surface **32** as shown in FIGS. **5** and **6**.

The seal base **18** contains a flipper **60** that extends from the exterior mounting portion **36**, as shown on FIG. 7. The flipper **60** has a tip **56**, an exterior surface **58** and an interior surface **62**. The interior surface **62** is adjacent to and intersects the mounting surface **31**. The flipper **60** is attached to the exterior mounting portion **36** opposite the connecting member **40** and extending at an obtuse angle therefrom in its relaxed position. The flipper is flexible and is designed to conform to an irregular surface. As is shown in FIG. 4, the flipper flattens out to become substantially parallel to mounting surface **31** when it abuts the proud surface **72**. This is particularly true when mounting surface **31** is pressed against a locally planar surface such as the proud surface **72** of the corrugated metal **76**. It extends inwardly toward the recessed surface **74**. The flipper **60** has sufficient length and resilience for the tip **56** to maintain contact to the proud surface **72**, the recessed surface, **74** and any transitional surface between. The flipper prevents gaps between the seal **19** and the sidewall **12** from being created by the varying distance between the proud surface **72**, and the recessed surface, **74** and the seal assembly **19**. At all locations where the flipper **60** contacts the exterior surface **58**, it is in biased contact with the exterior surface **58** due to its resilient nature.

When the slide out room **20** is fully retracted as shown in FIGS. **5** and **6**, the bulb seal **44** that is attached to the exterior mounting portion member **36** is compressed against the inside surface **32** of the exterior flange **30**. The bulb seal **44** deforms as pressure is formed between the wall **47** and the inside surface **32**, as is shown in FIGS. **5** and **6**.

To facilitate installation of the seal **19** on the unit **10**, the seal base **18** is first wrapped around the sidewall **12** such that transverse edge **42** abuts longitudinal connecting member **40**, mounting surface **33** abuts the inner surface **52**, mounting surface **31** abuts the proud surface **72** and recessed surface **74**. Screws **55** are then driven through exterior mounting portion **36**, and interior mounting portion **38** between tongues into **12**, preferably on the proud surface **72**. Optionally, a strip of double sided adhesive tape is affixed to any desired surface. The opposite side of the adhesive tape is covered by a protective removable coating that prevents it from sticking to anything. Optionally, the seal base **18** includes a strip of double sided adhesive tape attached to it and protected with a protective removable coating on the side that faces the side wall **12**. Once the seal base **18** is secured to the sidewall **12**, the bulb seals **44** can be installed on each mounting portion **36, 38**.

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The seal assembly may be easily adapted to fit to different slide-out room configurations by cutting any necessary length. A variety of different corner configurations in the opening may be easily adapted by cutting the bulb seal **44** to a different length than the seal base **18**, and the wiper **54** may be cut to a third length if necessary. A variety of different gaps between the mobile living quarter's sidewall and the slide-out room sidewalls may be easily adapted to by adjusting the lateral position of the seal base **18** relative the sidewall or trimming back the flipper **60**. By mounting the seal base **18** and the bulb seal **44** to the wall **12**, subsequent repair and replacement of worn bulb seals **44** may be easily performed without having to remove the slide out room **20** from the opening in wall **12**.

After adhesive tape is optionally attached to the outer surface and inner surface **52** of the side wall **12**, the seal assembly **19** may be more securely attached to the corresponding inside and outside surfaces **52** and **50** by appropriate mechanical fasteners. Screws **55** or nails may be driven through the mounting portions **36, 38** into the side wall **12**. Wiper seals **54** extend from the connecting portion **40** and are adapted to flex against the side walls **24** and ceiling wall of the slide out room **20** during extension and retraction of the latter. The exterior mounting member **36**, and the interior mounting member **38**, corresponding tongues, and bulb seal **44** form a pocket **46** that hides mechanical fasteners such as screws **55** driven through the mounting portions **36, 38**. FIG. **5** illustrates this.

It is understood that while certain aspects of the disclosed subject matter have been shown and described, the disclosed subject matter is not limited thereto and encompasses various other embodiments and aspects. No specific limitation with respect to the specific embodiments disclosed herein is intended or should be inferred. Modifications may be made to the disclosed subject matter as set forth in the following claims.

What is claimed is:

1. A resilient seal for living quarters having main living area walls defining a main living area, an aperture in one of said main living area walls slidably receiving a slide out room having slide out room walls defining auxiliary living space, said main living area wall having an outside surface, an inside surface, and a transverse surface extending between said inside and outside surfaces, said transverse surface defining said aperture, said seal comprising:

a seal base formed of a single resilient member having a pair of mounting portions adapted to extend along said main living area wall adjacent to said aperture, one of said mounting portions including a flipper integrally attached thereto, said flipper integrally connected to and facing away its corresponding mounting portion;

a connecting member extending between said mounting portions of said seal base and adapted to overlay said transverse surface;

a bulb seal adapted for connection to a corresponding mounting portion, said seal including a tongue connector carried by one of said corresponding mounting portion and said bulb seal and a groove connector carried by the other of said corresponding mounting portion and said bulb seal for releasably facilitating the connection of said bulb seal to said corresponding mounting portion; and

said flipper having a proximal end attached to said mounting portion opposite said connecting member and distal end opposite said proximal end defining a terminal end of said flipper, said flipper extending outwardly from said mounting portion so that said proximal end is nearer said connecting member and said distal end is relatively

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farther from said connecting member and said flipper adapted to extend inwardly toward said living area.

2. The resilient seal as claimed in claim 1, wherein said distal end of said flipper is located nearer said other mounting portion.

3. The resilient seal as claimed in claim 2, said mounting portion having outwardly facing tabs, said bulb seal having inwardly facing tabs to define said tongue and said groove connector.

4. The resilient seal as claimed in claim 3, wherein said connecting member includes a wiper extending substantially perpendicularly therefrom and adapted for engaging one of said slide out room walls.

5. The resilient seal as claimed in claim 3, wherein said inner wall of said bulb seal includes a web extending between opposing sides of said bulb seal such that compression of said bulb seal toward its corresponding mounting portion urges said protrusion to remain affixed to said mounting portion.

6. The resilient seal as claimed in claim 5, wherein said slide out room is movable between fully extended and fully retracted positions and carries a pair of offset flanges projecting outwardly from said slide out room walls, one of said flanges engaging a corresponding one of said bulbs when said slide out room is in the fully extended position, the other flange engaging the other bulb seal when said slide out room is in the fully retracted position.

7. A resilient seal for living quarters having main living area walls defining a main living area, an aperture in one of said main living area walls slidably receiving a slide out room having slide out room walls defining auxiliary living space, said main living area wall having an outside surface, an inside surface, and a transverse surface extending between said inside and outside surfaces, said transverse surface defining said aperture, said seal comprising:

- a seal base having a pair of mounting portions adapted to extend along said main living area wall adjacent to said aperture, one of said mounting portions including a flipper integrally attached thereto, said flipper integrally connected to and facing away its corresponding mounting portion;
- a connecting member extending between said mounting portions of said seal base and adapted to overlay said transverse surface; and
- a bulb seal adapted for connection to a corresponding mounting portion, said seal including a tongue connector carried by one of said corresponding mounting por-

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tion and said bulb seal and a groove connector carried by the other of said corresponding mounting portion and said bulb seal for releasably facilitating the connection of said bulb seal to said corresponding mounting portion.

8. The resilient seal as claimed in claim 7, said flipper having a proximal end attached to said mounting portion opposite said connecting member and distal end opposite said proximal end defining a terminal end of said flipper, said flipper extending outwardly from said mounting portion so that said proximal end is nearer said connecting member and said distal end is relatively farther from said connecting member.

9. The resilient seal as claimed in claim 8, wherein said distal end of said flipper is located nearer said other mounting portion.

10. The resilient seal as claimed in claim 9, wherein said connecting member includes a wiper extending substantially perpendicularly therefrom and adapted for engaging one of said slide out room walls.

11. The resilient seal as claimed in claim 10, said seal base is formed from a single member.

12. The resilient seal as claimed in claim 7, said flipper made from a lower durometer than said mounting portions of said seal base.

13. The resilient seal as claimed in claim 12, said mounting portion having outwardly facing tabs, said bulb seal having inwardly facing tabs to define said tongue and said groove connector.

14. The resilient seal as claimed in claim 13, said flipper having a proximal end attached to said mounting portion opposite said connecting member and distal end opposite said proximal end defining a terminal end of said flipper, said flipper extending outwardly from said mounting portion so that said proximal end is nearer said connecting member and said distal end of said flipper is located nearer said other mounting portion and said flipper adapted to extend inwardly toward said living area.

15. The resilient seal as claimed in claim 14, wherein said inner wall of said bulb seal includes a web extending between opposing sides of said bulb seal such that compression of said bulb seal toward its corresponding mounting portion urges said protrusion to remain affixed to said mounting portion.

16. The resilient seal as claimed in claim 7, said connecting member flexibly attached to said mounting portions.

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