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(54) **MOVABLE HOME WITH RETRACTABLE STRUCTURES**

(71) Applicant: **A&C FUTURE, INC.**, Newport Beach, CA (US)

(72) Inventors: **Zhuangboyu Zhou**, Santa Ana, CA (US); **Ju Gao**, Newport Beach, CA (US); **Jiuqi Wang**, Santa Ana, CA (US); **Sichen Li**, Santa Ana, CA (US); **Xunmin Jiang**, Irvine, CA (US); **Shoue CHEN**, Irvine, CA (US); **Han Qin**, Newport Beach, CA (US); **Jiayang Qin**, Newport Beach, CA (US)

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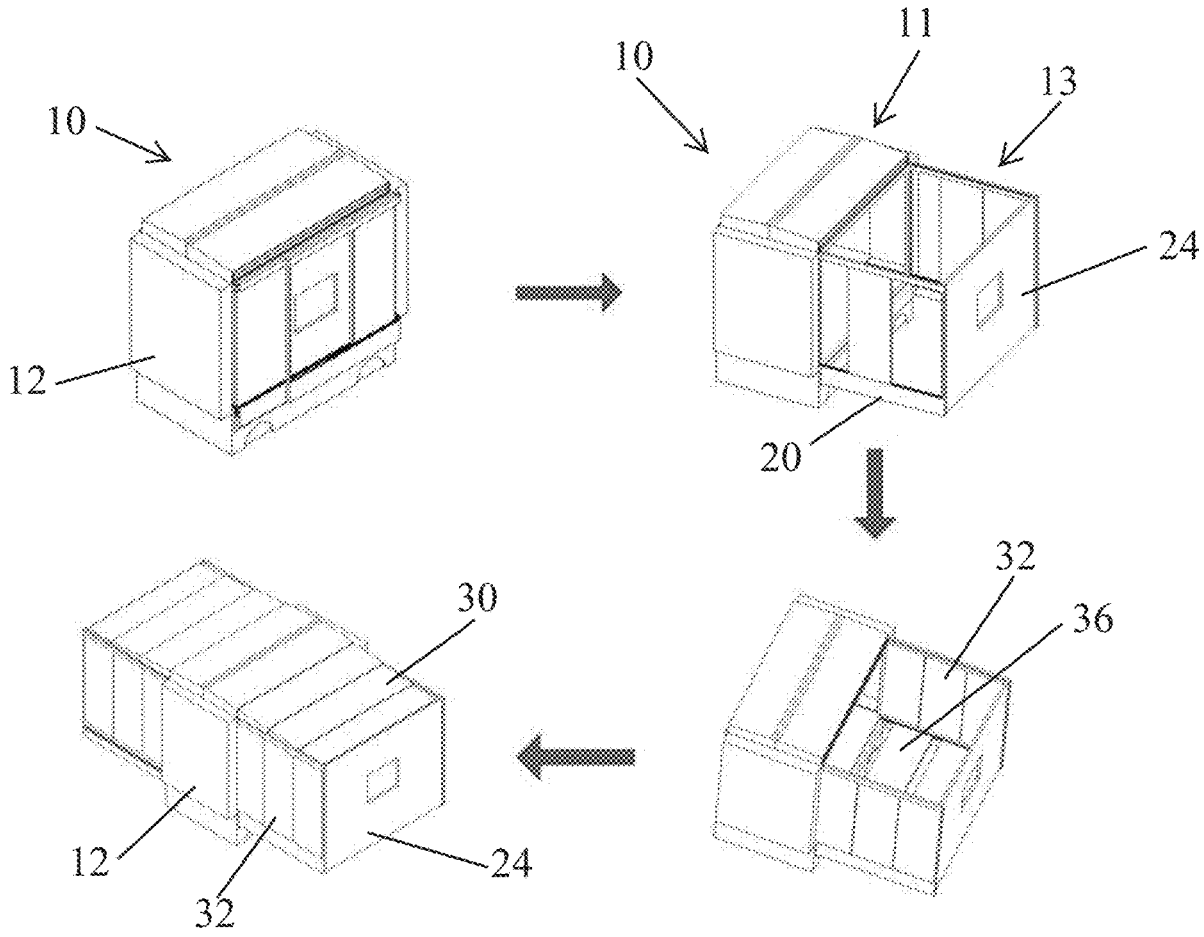
(57) **ABSTRACT**

A movable home with retractable structures includes expandable parts of the structure that can be split into frame and wall panels. Frames, including wall frames and a floor frame, can be folded into the main body. Wall panels can slide out of a box and form the walls of the house. Similarly, floor panels can slide out of a box and form the floor of the house. The boxes for the wall panels and the floor panels can be part of the overall footprint of the main retracted structure. One advantage of this method is that the wall panels and the floor panels will not interfere with the entire home, where a vehicle can transfer the retracted house to a desired location for expansion.



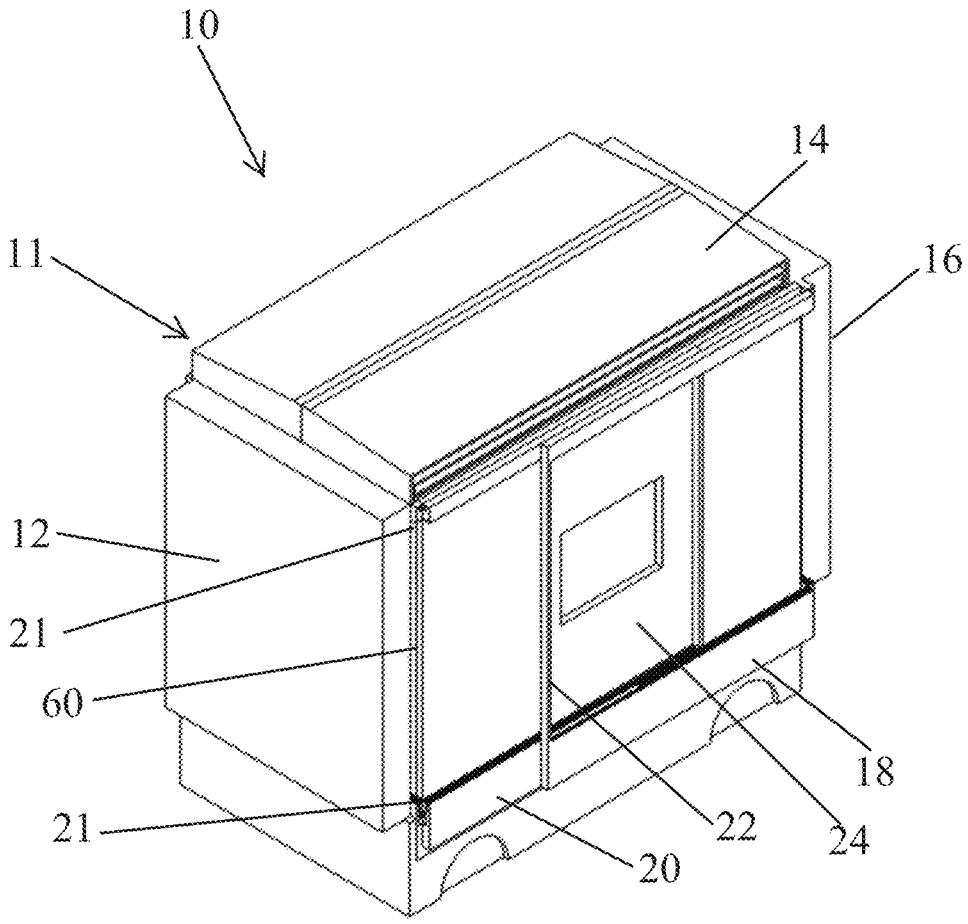


FIG. 1A

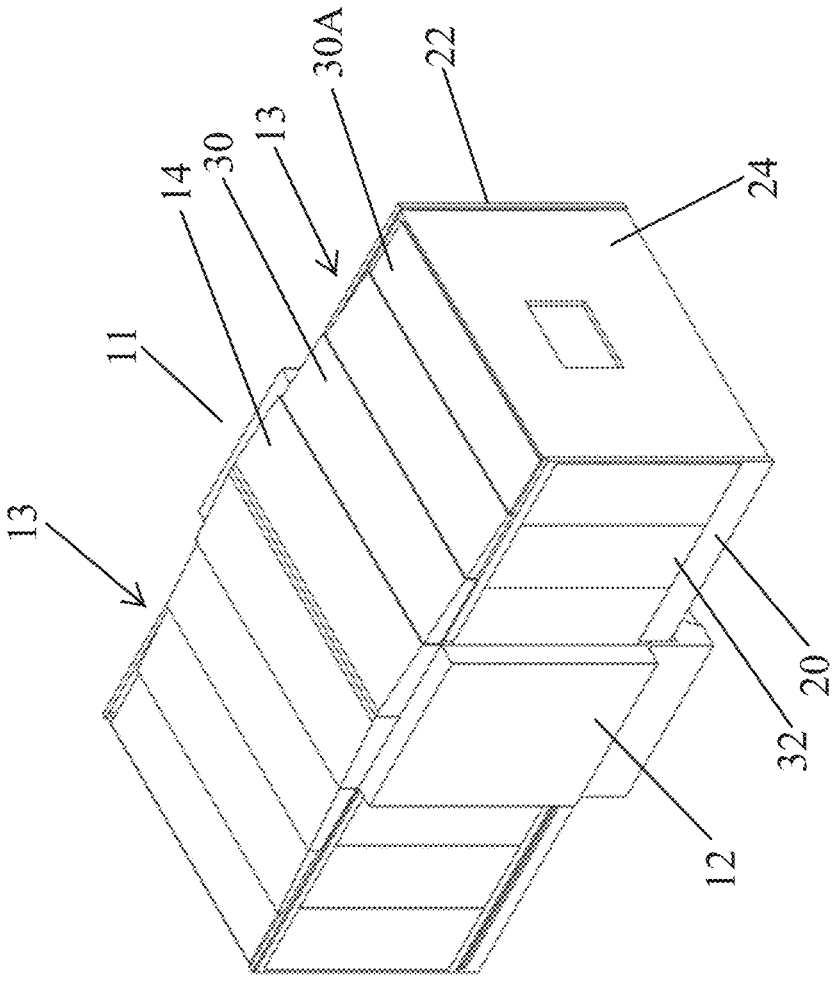


FIG. 1B

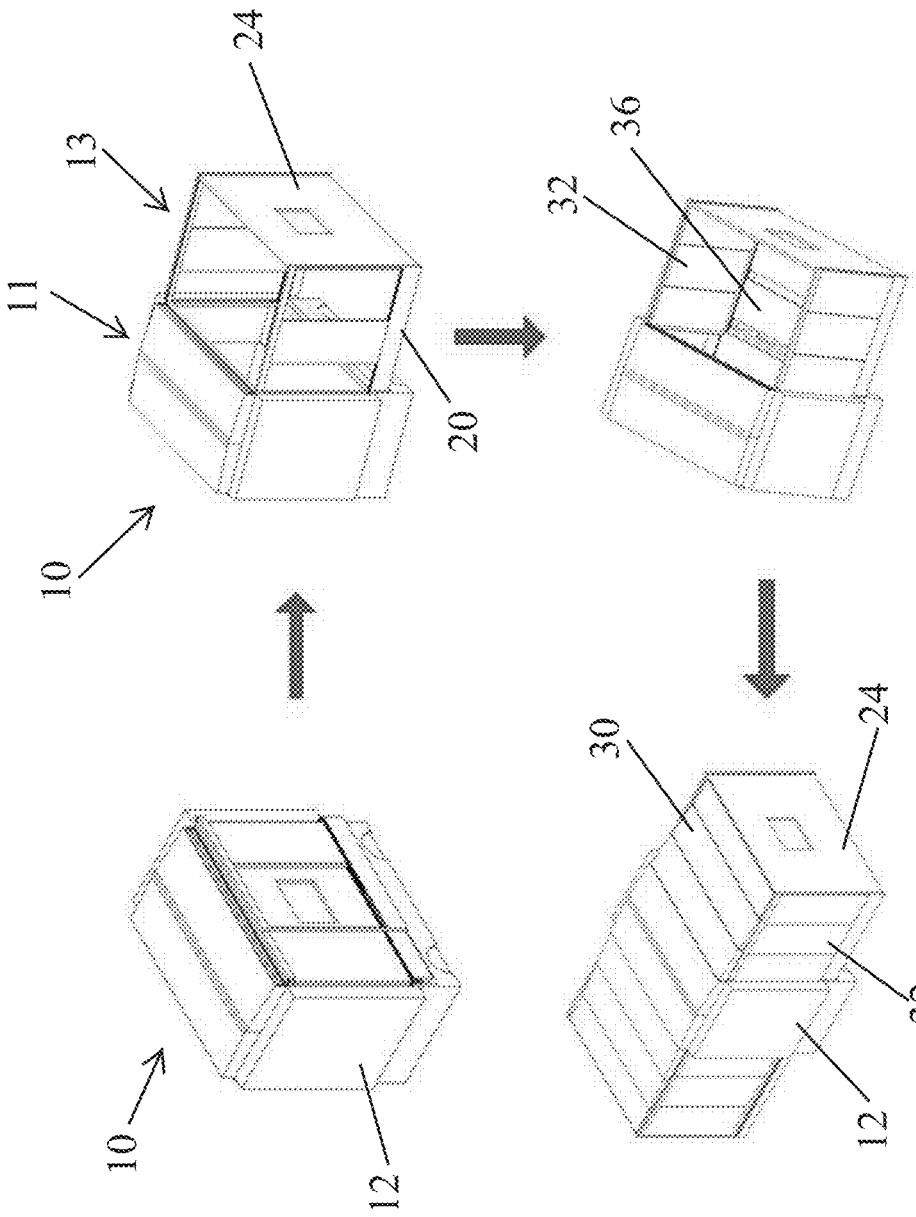


FIG. 2

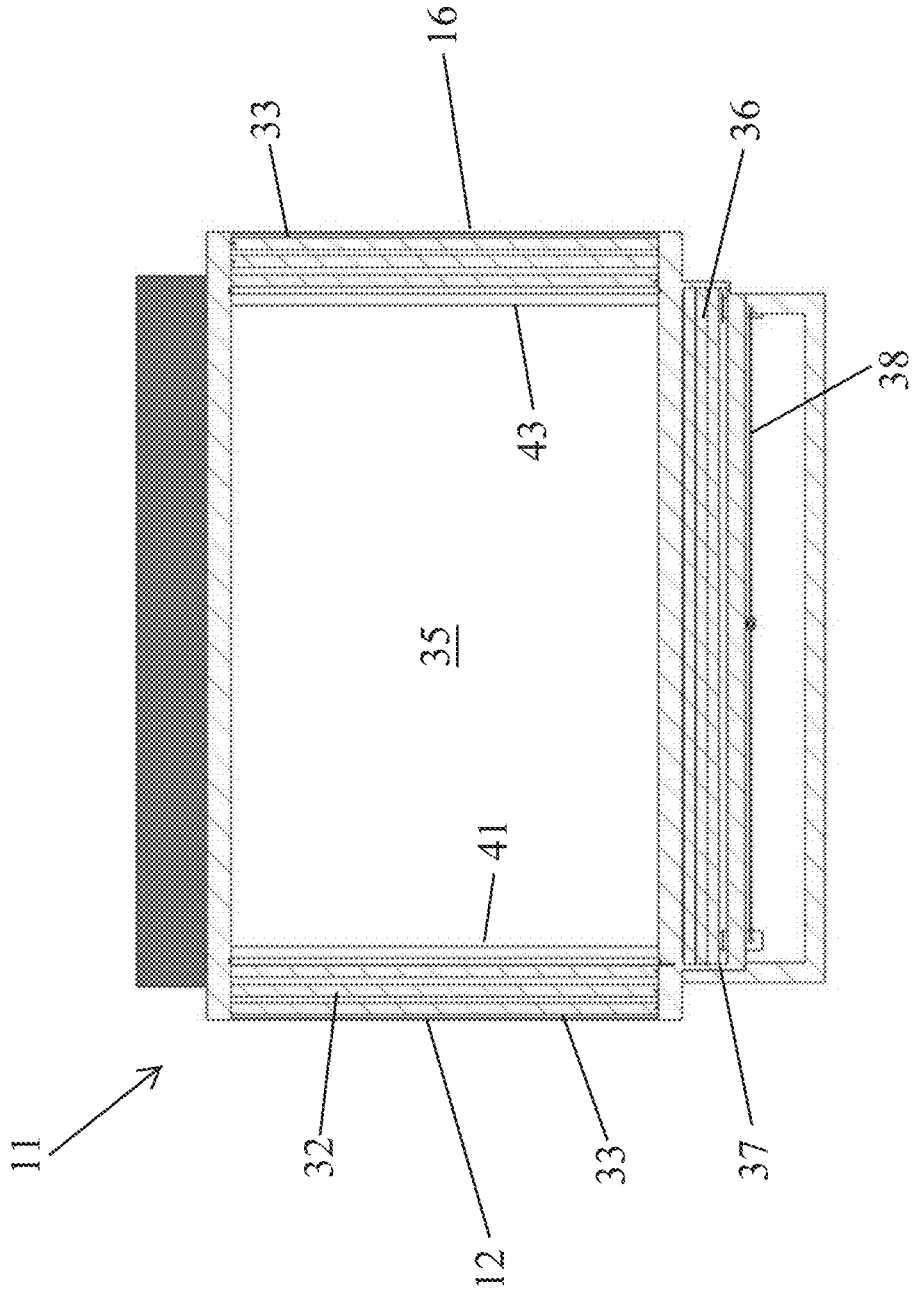


FIG. 3

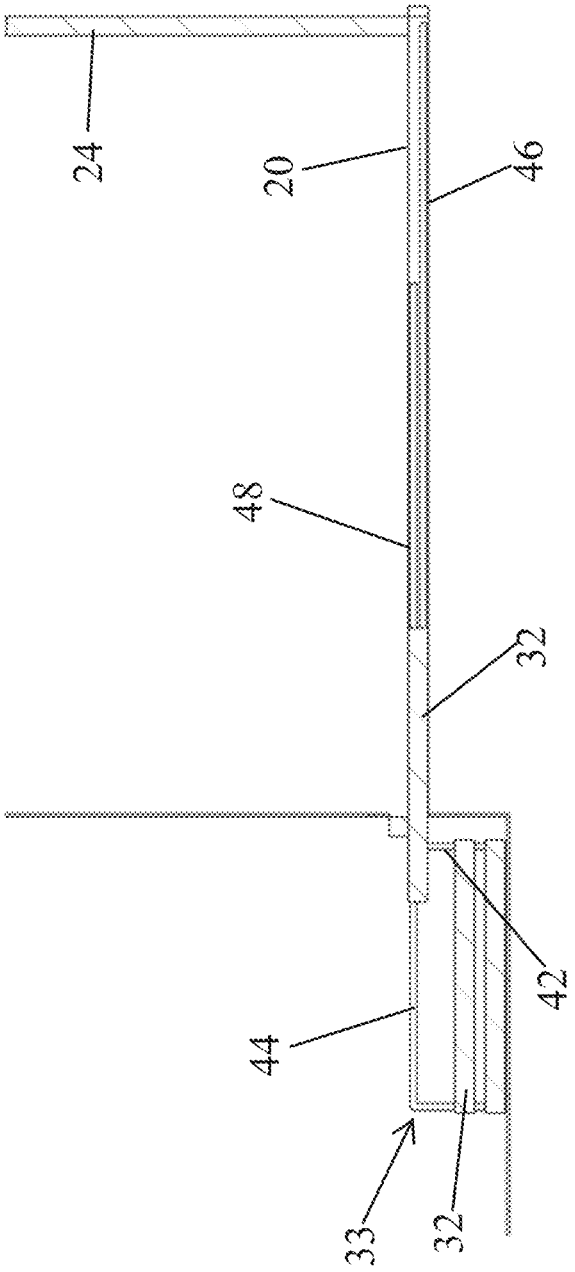


FIG. 4

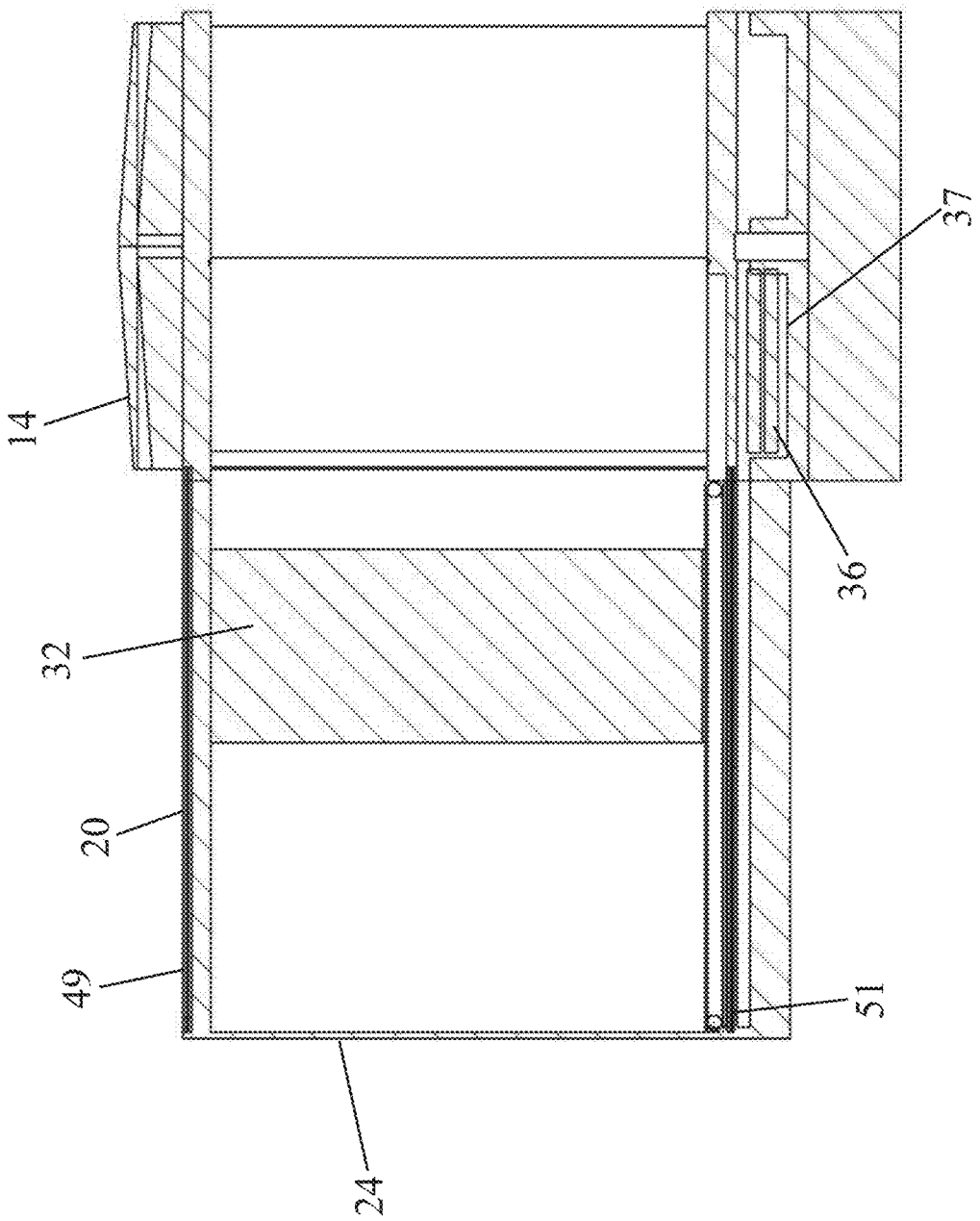


FIG. 5

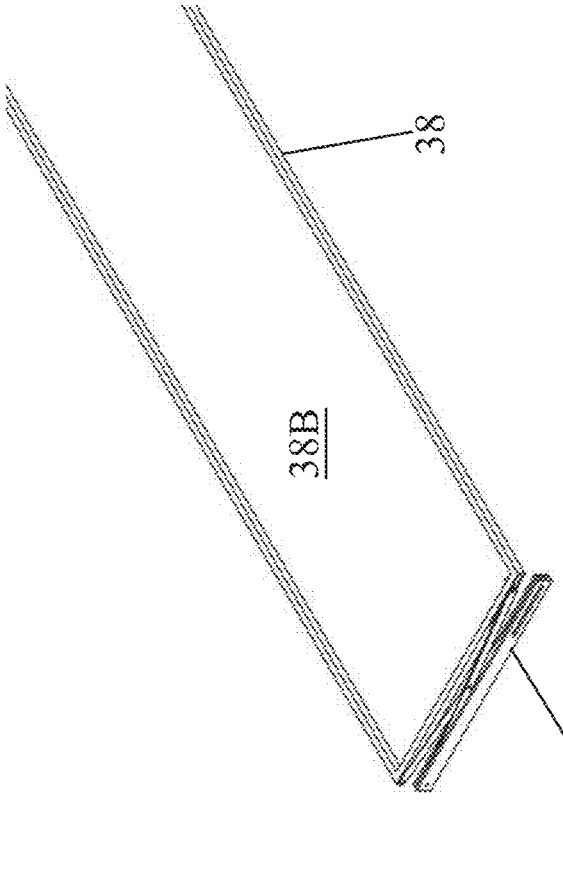


FIG. 6

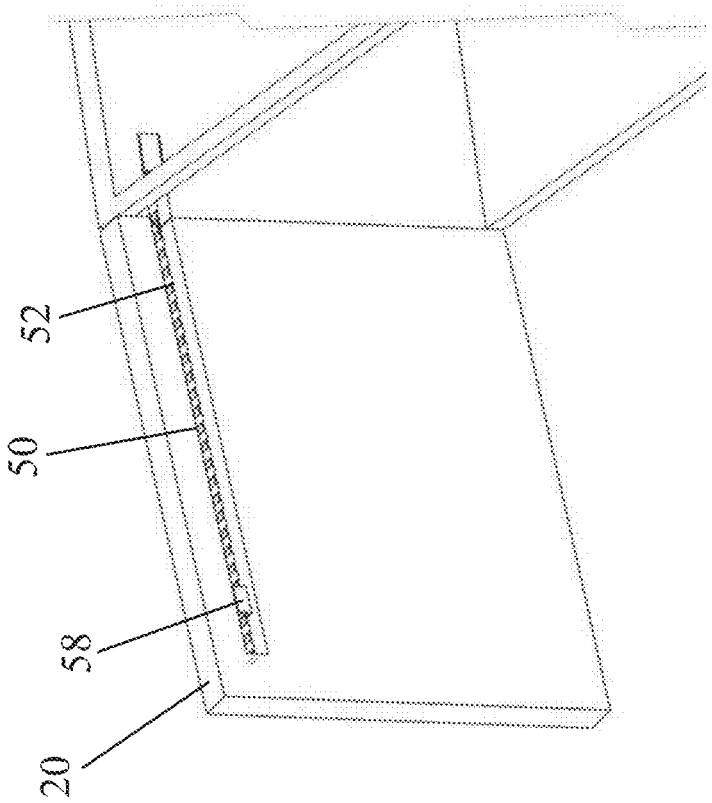


FIG. 7A

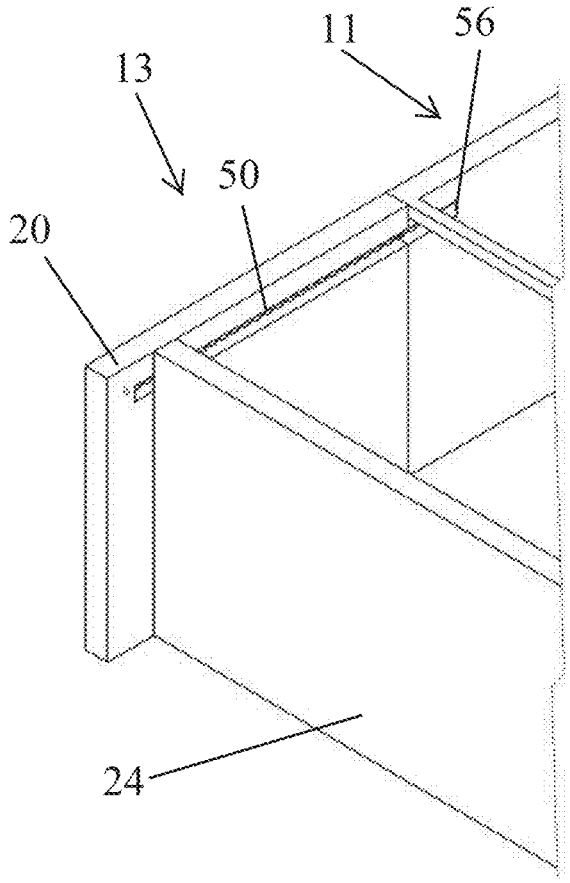


FIG. 7B

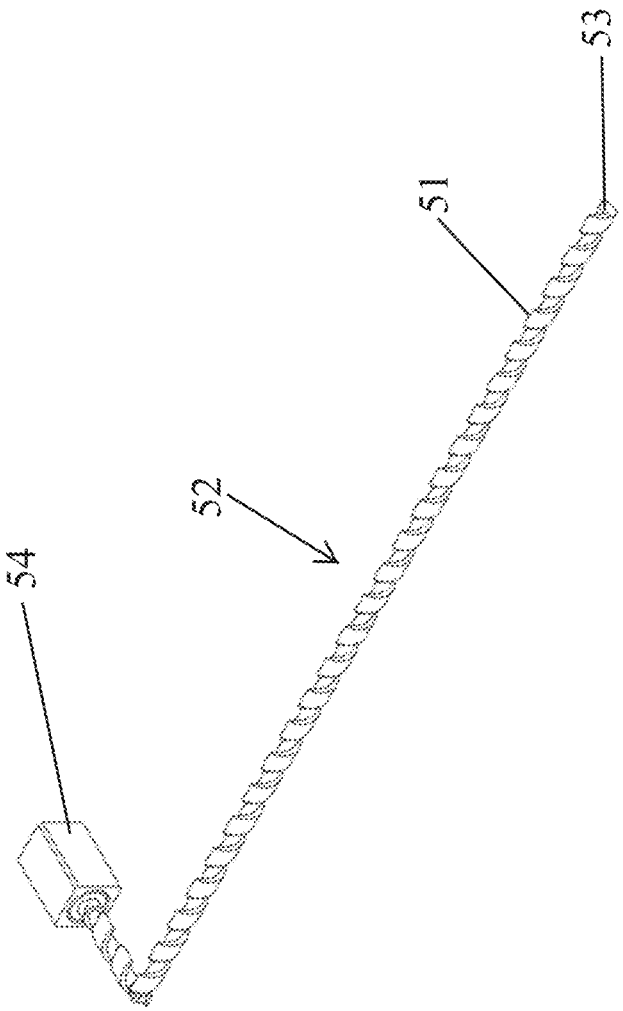


FIG. 7C

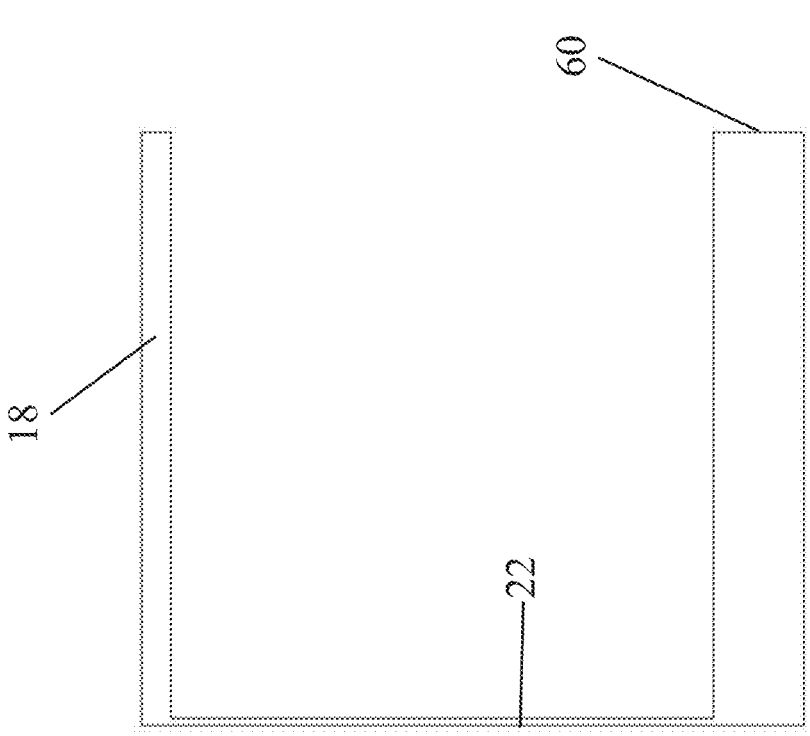


FIG. 8B

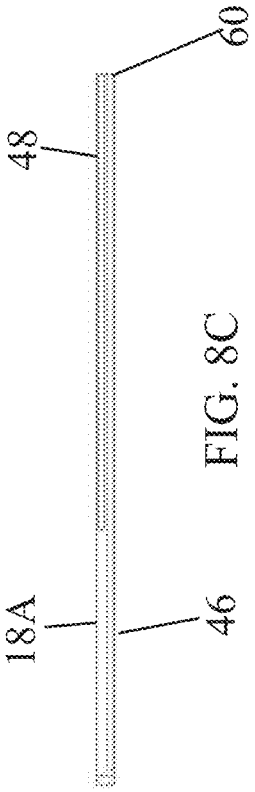


FIG. 8C

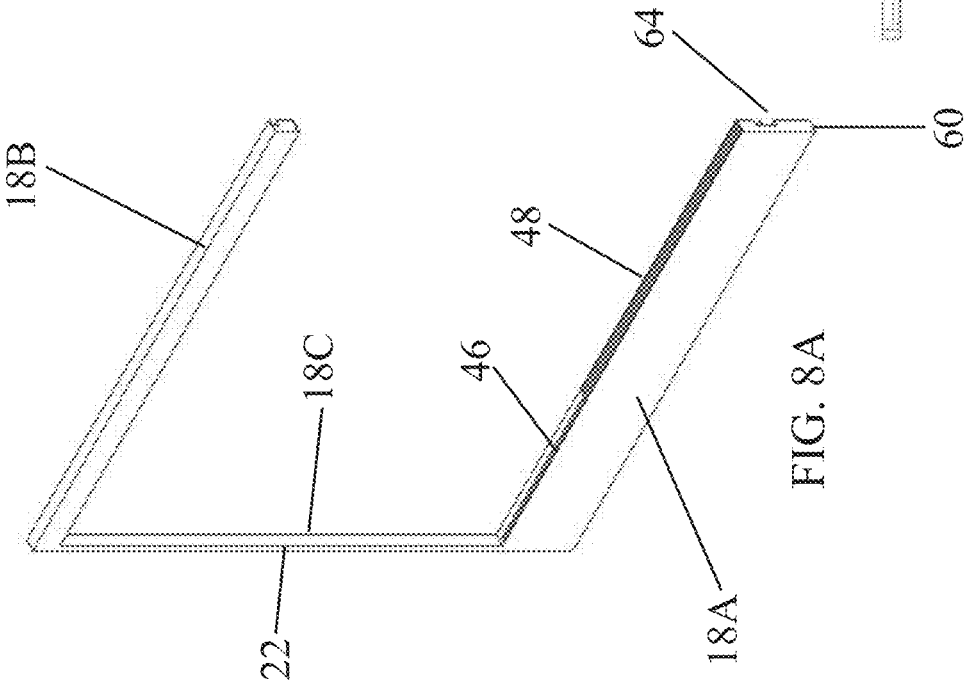


FIG. 8A

MOVABLE HOME WITH RETRACTABLE STRUCTURES

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] Embodiments of the invention relate generally to movable, retractable and expandable homes. More particularly, embodiments of the invention relate to a home that can expand and retract where side wall panels and floor panels are stored in a stacked arrangement within the main contracted structure for mobility.

2. Description of Prior Art and Related Information

[0002] The following background information may present examples of specific aspects of the prior art (e.g., without limitation, approaches, facts, or common wisdom) that, while expected to be helpful to further educate the reader as to additional aspects of the prior art, is not to be construed as limiting the present invention, or any embodiments thereof, to anything stated or implied therein or inferred thereupon.

[0003] Housing has always been a major concern for people. Traditional houses are located on the ground, in the form of villas or high-rise structures, with a stable structure and a large space. However, once built, it is impossible to change the location, and the construction period is long. Recreational Vehicles (RVs) are mobile and a good choice for going out to play and camping, but the width restriction of the body leads to a small interior space and low comfort when living.

[0004] The traditional villa construction process requires on-site fabrication and installation for the most structures and the construction cannot be prefabricated or has a low degree of prefabrication, resulting in a long construction cycle. The construction process requires professional construction teams for construction, which will occur high labor cost. As the house type is related to the size of the land, the house type needs to be changed or even redesigned for houses with different land sizes. Since there is no standardization of house types for houses with different lot sizes, each time a house is built, and redesigned by professionals.

[0005] In view of the foregoing, there is a need for a mobile house that overcomes the limitations of conventional mobile houses while providing a safe and comfortable living space.

SUMMARY OF THE INVENTION

[0006] Embodiments of the present invention aim to solve the aforementioned problems in conventional retractable living spaces.

[0007] One aspect of the present invention is to provide a structure that makes the dwelling both somewhat mobile while ensuring its original advantages of safety and comfort.

[0008] Embodiments of the present invention provide an expandable structure comprising a main structure; a front first side frame structure foldable against the main structure in a stowed state and openable to extend outward from the main structure in an expanded state; a rear first side frame structure foldable against the main structure in the stowed state and openable to extend outward from the main structure in the expanded state; a plurality of front wall panels stored in a stacked arrangement in the main structure, each of the plurality of front wall panels movable along tracks to provide a front wall in the front first side frame structure; a plurality of rear wall panels stored in a stacked arrangement in the main structure, each of the plurality of rear wall panels movable along tracks to provide a rear wall in the rear first side frame structure; and a plurality of floor panels, stored in a stacked arrangement in the main structure, each of the plurality of floor panels movable along tracks to provide a floor spanning between the front first side frame structure and the rear first side frame structure when each are in the expanded state.

[0009] Embodiments of the present invention provide an expandable structure, comprising a main structure; a front first side frame structure foldable against the main structure in a stowed state and openable to extend outward from the main structure in an expanded state; a rear first side frame structure foldable against the main structure in the stowed state and openable to extend outward from the main structure in the expanded state; a plurality of front wall panels stored in a stacked arrangement in a front wall panel box in the main structure, each of the plurality of front wall panels movable along tracks to provide a front wall in the front first side frame structure; a plurality of rear wall panels stored in a stacked arrangement in a rear wall panel box the main structure, each of the plurality of rear wall panels movable along tracks to provide a rear wall in the rear first side frame structure; and a plurality of floor panels, stored in a stacked arrangement in a floor panel box in the main structure, each of the plurality of floor panels movable along tracks to provide a floor spanning between the front first side frame structure and the rear first side frame structure when each are in the expanded state, wherein the front wall panel box is located between a front face of the main structure and a front-most interior wall of the main structure; the rear wall panel box is located between a rear face of the main structure and a rear-most interior wall of the main structure; and the floor panel box is located below a floor of the main structure.

[0010] Embodiments of the present invention provide an expandable structure comprising a main structure; a front first side frame structure foldable against the main structure in a stowed state and openable to extend outward from the main structure in an expanded state; a rear first side frame structure foldable against the main structure in the stowed state and openable to extend outward from the main structure in the expanded state; a plurality of front wall panels stored in a stacked arrangement in the main structure, each of the plurality of front wall panels movable along tracks to provide a front wall in the front first side frame structure; a plurality of rear wall panels stored in a stacked arrangement in the main structure, each of the plurality of rear wall panels movable along tracks to provide a rear wall in the rear first side frame structure; a retractable roof formed from a plurality of roof panels stored in the main structure when in the stowed state and deployable extend between the front first side frame structure and the rear first side frame structure to cover an expanded section formed in the expanded state; a plurality of floor panels, stored in a stacked arrangement in the main structure, each of the plurality of floor panels movable along tracks to provide a floor spanning between the front first side frame structure and the rear first side frame structure when each are in the expanded state; an outer wall disposed adjacent the main structure, inside each of the folded front and rear first side frame structures when in the stowed state; slots formed along each

of the front and rear first side frame structures; and a ball screw rod disposed within each of the slots in each of the front and rear first side frame structures, wherein the ball screw rod extends along the slot in each of the front and rear first side frame structures to terminate within the main structure; the ball screw rod is generally linear when the expandable structure is in the expanded state; and the ball screw rod is angled when the expandable structure is in the stowed state.

[0011] These and other features, aspects and advantages of the present invention will become better understood with reference to the following drawings, description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Some embodiments of the present invention are illustrated as an example and are not limited by the figures of the accompanying drawings, in which like references may indicate similar elements.

[0013] FIG. **1**A illustrates a front perspective view of a movable home with retractable structures, in a retracted state, according to an exemplary embodiment of the present invention;

[0014] FIG. **1**B illustrates a front perspective view of the movable home with retractable structures of FIG. **1**A, in an expanded state;

[0015] FIG. **2** illustrates a pictorial representation of the expansion of the movable house of FIG. **1**A;

[0016] FIG. **3** illustrates a side cross-sectional view of the movable house of FIG. **1**A, showing all wall panels and floor panels in their retracted state;

[0017] FIG. **4** illustrates a top cross-sectional view of the movable house of FIG. **1**A, showing movement of the wall panels from storage to an expanded state;

[0018] FIG. **5** illustrates a side cross-sectional view of the movable house of FIG. **1**A, showing movement of the wall panels from storage to an expanded state;

[0019] FIG. **6** illustrates a floor panel pushing apparatus usable to move the floor panels into a position for deployment, according to an exemplary embodiment of the present invention;

[0020] FIG. **7**A illustrates a partially cut-away perspective view of an inside of a side wall, showing a track for expansion of an outside wall;

[0021] FIG. **7**B illustrates the outside wall partially expanded outward;

[0022] FIG. **7**C illustrates a ball screw rod used in the track of FIG. **7**A;

[0023] FIG. **8**A illustrates an outside perspective view of a foldable side wall;

[0024] FIG. **8**B illustrates an outside view of the foldable side wall of FIG. **8**A; and

[0025] FIG. **8**C illustrates a top view of the lower frame member of FIG. **8**A.

[0026] The illustrations in the figures may not necessarily be drawn to scale.

[0027] The invention and its various embodiments can now be better understood by turning to the following detailed description wherein illustrated embodiments are described. It is to be expressly understood that the illustrated embodiments are set forth as examples and not by way of limitations on the invention as ultimately defined in the claims.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS AND BEST MODE OF INVENTION

[0028] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items. As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well as the singular forms, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups thereof.

[0029] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one having ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and the present disclosure and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0030] In describing the invention, it will be understood that a number of techniques and steps are disclosed. Each of these has individual benefit and each can also be used in conjunction with one or more, or in some cases all, of the other disclosed techniques. Accordingly, for the sake of clarity, this description will refrain from repeating every possible combination of the individual steps in an unnecessary fashion. Nevertheless, the specification and claims should be read with the understanding that such combinations are entirely within the scope of the invention and the claims.

[0031] In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be evident, however, to one skilled in the art that the present invention may be practiced without these specific details.

[0032] The present disclosure is to be considered as an exemplification of the invention and is not intended to limit the invention to the specific embodiments illustrated by the figures or description below.

[0033] As is well known to those skilled in the art, many careful considerations and compromises typically must be made when designing for the optimal configuration of a commercial implementation of any system, and in particular, the embodiments of the present invention. A commercial implementation in accordance with the spirit and teachings of the present invention may be configured according to the needs of the particular application, whereby any aspect(s), feature(s), function(s), result(s), component(s), approach (es), or step(s) of the teachings related to any described embodiment of the present invention may be suitably omitted, included, adapted, mixed and matched, or improved and/or optimized by those skilled in the art, using their average skills and known techniques, to achieve the desired implementation that addresses the needs of the particular application.

[0034] Broadly, embodiments of the present invention provide a movable home with retractable structures. Expandable parts of the structure can be split into frame and wall panels. Frames, including wall frames and a floor frame, can be folded into the main body. Wall panels can slide out of a box and form the walls of the house. Similarly, floor panels can slide out of a box and form the floor of the house. The boxes for the wall panels and the floor panels can be part of the overall footprint of the main retracted structure. One advantage of this method is that the wall panels and the floor panels will not interfere with the entire home, where a vehicle can transfer the retracted house to a desired location for expansion.

[0035] The figures are briefly described below, followed by a broader discussion of each figure and the components therein.

[0036] FIGS. **1**A and **1**B illustrate the folded status and expanded status, respectively, of the mobile house vehicle design. Since there is size limit of recreational vehicles, the retracted: expanded ratio in this design is near 1:3. The main body of the house is shown in FIG. **1**A. It can be an individual trailer or combined with a chassis to form a motorhome like class C RV, for example. After the wall has been expanded out, it will form a small house with two more rooms on the sides. Of course, while both sides are shown expanded, the house may be designed to expand outward on only one side. The detailed description below describes expansion of one side, with the understanding that both sides can operate in a similar manner.

[0037] FIG. **2** provides a flow chart of how the mobile house vehicle expanded. The steps will be as follows: (1) Open the frame from on each side. Lock the frame with the axis when it has turned 90 degrees. Let the frame be parallel to the front face. (2) Slide out the most outside walls on both sides (wall with a window as shown). (3) Slide out the side wall panels from the box and form four side walls. (4) Slide out the floor panels from the chassis. And (5) slide out the roof (this step can be combined with step (2) while sliding out the most outside walls).

[0038] FIG. **3** is a sectional view of the folded status. As shown in the figure, wall panels are stored in the box on two ends of the main structure. The side wall panels are restricted to the track on the chassis. These tracks are connected to the tracks on the side frames. It leads the side wall panels to slide out from the box.

[0039] FIG. **4** illustrates the motion track of the wall panels. As shown in the drawing, there are two tracks on the frame. There are two sliders located on the diagonal of the side wall panel. The two sliders are mate with the two tracks. Such double track sliders design will keep the side wall panel move without rotating. The wall panels move along the track. They slide out from the storage and move along the frame.

[0040] FIG. **5** illustrates the actuate system for the side wall panel. The wall panels are pushed out or back in its storage depending on need. Since the tracks are designed with a curve, the side wall panel will be pushed onto the transmission belt which located on the side frame. The transmission belt brings the side wall panels out and back.

[0041] FIG. **6** shows the mechanism for pushing out the floor. The floor panels are in the chassis. The floor panels have a similar slider design to that of the wall panels. A double track can keep the floor moving along the frame. There is a lift at the bottom which pushes out the floor panels. The lift mechanism can be replaced with any form, such as a hydraulic rod, for example.

[0042] FIGS. **7**A, **7**B, and **7**C illustrate how the outside wall slides out along the side frame. There is a rotatable ball screw mechanism design in the frame. When the side frame has been spread out, the ball screw rod is co-linear. The ball screw rod can be driven by the motor at the end. The rod has two parts. One part is fixed in the frame, and another part is connected to a motor on the main body frame. Two parts of the rod connected by an invisible bolt. There is an axis on the main part which let the outside part rotate around the main part of the rod. When the frame is folded back, the ball screw rod can be folded as well. After the frame has been pushed out, the rod will keep colinear. The thread is continuous. When the motor rotates, it drives the sliders out. The sliders bring the outside wall out.

[0043] FIGS. **8**A, **8**B and **8**C illustrate the frame design. There should be slots extending in a vertical direction for the side wall panels. Horizontally extending slots are provided for the outside wall panel.

[0044] Referring now to FIGS. **1**A and **1**B, the mobile home **10** (also referred to as home **10** or movable home **10**) can include a main structure **11** from which the expanded sections **13** may extend. The main structure **11** can include a font face **12** and a back face **16** and a roof system **14**. On one or both sides of the main structure **11**, an expanded sections **13** may extend.

[0045] The expanded sections **13** can include side frames **18**, **20** that may pivotably attach to the main structure **11** and, in the retracted state, as shown in FIG. **1**A, stackingly fold against the main structure **11**. While FIG. **1**A shows the rear side frame **18** folded on top of the front side frame **20**, this order may be different depending on the desired orientation. The side frames **18**, **20** may pivotably attach to the main structure **11** at an attachment end **60** thereof (see also, FIGS. **8**A through **8**C). Hinges **21**, or similar pivot structures, may be provided to permit the side frames **18**, **20** to pivotably connect to the main structure **11**. A distal end **22** of the side frames **18**, **20** may rotate outward so that the side frames **18**, **20** are generally co-planar with the front face **12** and rear face **16** of the main structure **11**.

[0046] After the side frames **18**, **20** are expended, wall panels **32** may be slid into place to provide front and rear walls of the expanded section **13**. An outer wall **24** may be slid outward from being positioned against the main structure **11** to provide the outer wall **24** at the distal ends **22** of the side frames **18**, **20**. Roof panels **30** may slide out from a roof system **14** of the main structure **11** to form a roof over the extended sections **13**.

[0047] FIG. **2** shows steps in the expansion of the movable home **10**, where the side frames **18**, **20** are first folded out from the main structure **11** and the outer wall **24** is positioned at the distal end thereof. The floor panels **36** are slid out to form the floor and the wall panels **32** are slid out to form the walls, as discussed in greater detail below. Then, the roof panels **30** may be extracted to form the roof. In some embodiments, an outermost one **30**A of the roof panels **30** may be attached to the outer wall **24**, where sliding the outer wall **24** out, moves the outermost one **30**A of the roof panels **30** outward, where the remaining roof panels **30** are interconnected to by pulled outward and into position with the movement of the outermost one **30**A of the roof panels **30**.

[0048] FIG. **3** shows a cross sectional view of the main structure **11** when in a retracted state, where wall panels **32**

are stored in a wall panel box **33** adjacent the front face **12** and the rear face **16** of the main structure **11**. The floor panels **36** may be stored in a floor panel box **37** below the floor of the main structure **11**. Thus, within the main structure **11**, any furniture, appliances, or the like, may be stored, where retraction and expansion of the extended sections **13** (see FIG. **1**B) do not require movement or change in the position of any furniture or appliances that may be disposed inside the main structure **11**. In other words, there are no slides or any movable structures inside an interior space **35** of the main structure **11**. In other words, the front wall panels are stored in the wall panel box **33** located between the front face **12** and the interior front-most wall **41** and the rear wall panels are stored in the wall panel box **33** located between the rear face **16** and the interior rear-most wall **43** of the main structure **11**.

[0049] Referring now to FIGS. **4**, **5** and **8**A through **8**C, the side frames **18**, **20** are described in greater detail. The side frames **18**, **20** may include a lower frame member **18**A extending outward from an attachment end **60** of the side frames **18**, **20** along a bottom side thereof. An upper frame member **18**B can extend outward from an attachment end **60** of the side frames **18**, **20** along a top side thereof. An end member **18**C can join the lower frame member **18**A and the upper frame member **18**B to form the distal end **22** of the side frames **18**, **20**.

[0050] While only the lower frame member **18**A is discussed, it should be understood that the vertically extending slots **46**, **48** discussed below are also formed in the upper frame member **18**B. As best seen in FIGS. **4** and **8**C, the lower frame member **18**A (and the upper frame member **18**B, not shown in FIGS. **4** and **8**C) can include a first slot **46**, extending along nearly an entirety of the upper surface of the lower frame member **18**A, and a second slot **48** extending from the attachment end **60** and terminating before the distal end **22** of the lower frame member **18**A. The space between the end of the second slot **48** and the distal end **22** of the lower frame member **18**A may approximate a spacing of one of the wall panels **32**. The wall panels **32** may slide along the slots **46**, **48** to extend outward to deploy the wall panels **32** as described above. The first and second slots **46**, **48** may extend from the top edge of the lower frame member **18**A (or from the bottom edge of the upper frame member **18**B), vertically into the lower frame member **18**A (or vertically into the upper frame member **18**B). Various movement mechanisms may be used to move the wall panels **32**, such as a transmission belt **49**, for example. In some embodiments, the wall panels **32** may be manually moved and locked into place. The wall panels **32** may interconnect together in various manners, such as a tongue and groove attachment, a lap attachment, a butt connection or the like.

[0051] As can be seen in FIG. **4**, the wall panel box **33** may include tracks **42**, **44** for moving the wall panels **32** out from the wall panel box **33** and onto the slots **46**, **48**. At least one of the tracks **44** in the wall panel box **33** can communicate with at least one of the slots **46**, **48** when the wall is expanded, as shown in FIG. **4**.

[0052] Referring now to FIGS. **5** and **6**, the floor panels **36** may be deployed from the floor panel box **37** in a manner similar to that of the wall panels **32**, described above. The floor panels **36** may be lifted out of the floor panel box **37** by a lift mechanism **38**, as shown in FIG. **6**. The lift mechanism **38** can include a lift platform **38**B, supporting the floor panels **36**, and a lift structure, such as a scissor jack **38**A. Of course, as discussed above, other lifting structures may be used, such a mechanical, pneumatic, hydraulic, or the like. The floor panels **36** may be moved outward along a floor panel slot **64** formed horizontally into an inside surface of the lower frame member **18**A (sec FIG. **8**A). In some embodiments, various movement mechanisms may be used to move the floor panels **36**, such as a transmission belt **51**, for example. In some embodiments, the floor panels **36** may be manually moved and locked into place. The floor panels **36** may interconnect together in various manners, such as a tongue and groove attachment, a lap attachment, a butt connection or the like.

[0053] Referring now to FIGS. **7**A through **7**C, the outer wall **24** may be moved along a slot **50** formed along the side frames **18**, **20**. A ball screw rod **52** may be disposed inside the slot **50**. An attachment end **54** may be turned by a motor **56**. Typically, the motor **56** is disposed in the main structure **11** and the ball screw rod **52** may extend from the main structure **11** into the extended section **13**. When the frame structures **18**, are folded in the retracted state (as shown in FIG. **1**A), the ball screw rod **52** may fold, as shown in FIG. **7**C. When the frame structures **18**, **20** are extended, the ball screw rod **52** may be substantially linear, as shown in FIGS. **7**A and **7**B.

[0054] The ball screw rod **52** may have threads **51** that turn about an inner shaft **53** when the motor **56** turns the attachment end **54**. A nut **58** may move along the ball screw rod **52** during rotation thereof. The outer wall **24** may be connected to the nut **58** to permit the outer wall **24** to be moved with movement of the nut **58** caused by rotation of the threads **51** of the ball screw rod **52**.

[0055] While the movement structure is shown only on the upper side of the side frames **18**, **20**, an additional movement structure may be provided along a lower side of the side frames **18**, **20** to ensure the outer wall **24** remains parallel to the main structure **11** as the outer wall **24** is moved outward.

[0056] All the features disclosed in this specification, including any accompanying abstract and drawings, may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0057] Claim elements and steps herein may have been numbered and/or lettered solely as an aid in readability and understanding. Any such numbering and lettering in itself is not intended to and should not be taken to indicate the ordering of elements and/or steps in the claims.

[0058] Many alterations and modifications may be made by those having ordinary skill in the art without departing from the spirit and scope of the invention. Therefore, it must be understood that the illustrated embodiments have been set forth only for the purposes of examples and that they should not be taken as limiting the invention as defined by the following claims. For example, notwithstanding the fact that the elements of a claim are set forth below in a certain combination, it must be expressly understood that the invention includes other combinations of fewer, more or different ones of the disclosed elements.

[0059] The words used in this specification to describe the invention and its various embodiments are to be understood not only in the sense of their commonly defined meanings,

but to include by special definition in this specification the generic structure, material or acts of which they represent a single species.

[0060] The definitions of the words or elements of the following claims are, therefore, defined in this specification to not only include the combination of elements which are literally set forth. In this sense it is therefore contemplated that an equivalent substitution of two or more elements may be made for any one of the elements in the claims below or that a single element may be substituted for two or more elements in a claim. Although elements may be described above as acting in certain combinations and even initially claimed as such, it is to be expressly understood that one or more elements from a claimed combination can in some cases be excised from the combination and that the claimed combination may be directed to a subcombination or variation of a subcombination.

[0061] Insubstantial changes from the claimed subject matter as viewed by a person with ordinary skill in the art, now known or later devised, are expressly contemplated as being equivalently within the scope of the claims. Therefore, obvious substitutions now or later known to one with ordinary skill in the art are defined to be within the scope of the defined elements.

[0062] The claims are thus to be understood to include what is specifically illustrated and described above, what is conceptually equivalent, what can be obviously substituted and also what incorporates the essential idea of the invention.

What is claimed is:

1. An expandable structure comprising:

a main structure;

a front first side frame structure foldable against the main structure in a stowed state and openable to extend outward from the main structure in an expanded state;

a rear first side frame structure foldable against the main structure in the stowed state and openable to extend outward from the main structure in the expanded state;

a plurality of front wall panels stored in a stacked arrangement in the main structure, each of the plurality of front wall panels movable along tracks to provide a front wall in the front first side frame structure;

a plurality of rear wall panels stored in a stacked arrangement in the main structure, each of the plurality of rear wall panels movable along tracks to provide a rear wall in the rear first side frame structure; and

a plurality of floor panels, stored in a stacked arrangement in the main structure, each of the plurality of floor panels movable along tracks to provide a floor spanning between the front first side frame structure and the rear first side frame structure when each are in the expanded state.

2. The expandable structure according to claim **1**, wherein the front first side frame structure and the rear first side frame structure extend co-planer with each other and with a front face and a rear face of the main structure when in the expanded state.

3. The expandable structure of claim **1**, wherein an open space inside the main structure is unchanged when changing between the expanded state and the stowed state.

4. The expandable structure of claim **1**, further comprising:

a front wall panel box storing the plurality of front wall panels in a stacked arrangement, the front wall panel box located adjacent a front face of the main structure; and

a rear wall panel box storing the plurality of rear wall panels in a stacked arrangement, the rear wall panel box located adjacent a rear face of the main structure.

5. The expandable structure of claim **1**, further comprising a retractable roof formed from a plurality of roof panels stored in the main structure when in the stowed state and deployable extend between the front first side frame structure and the rear first side frame structure to cover an expanded section formed in the expanded state.

6. The expandable structure of claim **5**, wherein an outermost one of the plurality of roof panels is connected to an outer wall, wherein extension of the outer wall causes deployment of the retractable roof.

7. The expandable structure of claim **1**, further comprising an outer wall disposed adjacent the main structure, inside each of the folded front and rear first side frame structures when in the stowed state.

8. The expandable structure of claim **7**, wherein the outer wall is movable along slots formed along each of the front and rear first side frame structures.

9. The expandable structure of claim **8**, further comprising a ball screw rod disposed within each of the slots in each of the front and rear first side frame structures.

10. The expandable structure of claim **9**, wherein the outer wall is attached to a nut movable along the ball screw rod during rotation thereof.

11. The expandable structure of claim **10**, wherein:

the ball screw rod extends along the slot in each of the front and rear first side frame structures to terminate within the main structure;

the ball screw rod is generally linear when the expandable structure is in the expanded state; and

the ball screw rod is angled when the expandable structure is in the stowed state.

12. The expandable structure of claim **10**, further comprising a motor operable to turn the ball screw rod to move the outer wall between the expanded state and the stowed state.

13. The expandable structure of claim **1**, further comprising a lift structure operable to lift the plurality of floor panels out of a floor panel box to deploy the plurality of floor panels between the front and rear first side frame structures.

14. The expandable structure of claim **1**, further comprising:

a front second side frame structure foldable against a second side of the main structure in the stowed state and openable to extend outward from the second side of the main structure in the expanded state, the second side being opposite a first side having the front first side frame structure;

a rear second side frame structure foldable against the second side of the main structure in a stowed state and openable to extend outward from the second side of the main structure in the expanded state;

a plurality of second side front wall panels stored in a stacked arrangement in the main structure, each of the plurality of second side front wall panels movable along tracks to provide a second side front wall in the front second side frame structure;

a plurality of second side rear wall panels stored in a stacked arrangement in the main structure, each of the plurality of second side rear wall panels movable along tracks to provide a second side rear wall in the rear second side frame structure; and

a plurality of second side floor panels, stored in a stacked arrangement in the main structure, each of the plurality of second side floor panels movable along tracks to provide a second side floor spanning between the front second side frame structure and the rear second side frame structure when each are in the expanded state.

15. An expandable structure, comprising:

a main structure;

a front first side frame structure foldable against the main structure in a stowed state and openable to extend outward from the main structure in an expanded state;

a rear first side frame structure foldable against the main structure in the stowed state and openable to extend outward from the main structure in the expanded state;

a plurality of front wall panels stored in a stacked arrangement in a front wall panel box in the main structure, each of the plurality of front wall panels movable along tracks to provide a front wall in the front first side frame structure;

a plurality of rear wall panels stored in a stacked arrangement in a rear wall panel box the main structure, each of the plurality of rear wall panels movable along tracks to provide a rear wall in the rear first side frame structure; and

a plurality of floor panels, stored in a stacked arrangement in a floor panel box in the main structure, each of the plurality of floor panels movable along tracks to provide a floor spanning between the front first side frame structure and the rear first side frame structure when each are in the expanded state, wherein:

the front wall panel box is located between a front face of the main structure and a front-most interior wall of the main structure;

the rear wall panel box is located between a rear face of the main structure and a rear-most interior wall of the main structure; and

the floor panel box is located below a floor of the main structure.

16. The expandable structure of claim **15**, further comprising an outer wall disposed adjacent the main structure, inside each of the folded front and rear first side frame structures when in the stowed state.

17. The expandable structure of claim **16**, further comprising a ball screw rod disposed within slots formed along each of the front and rear first side frame structures, wherein the outer wall moves with turning of the ball screw rod.

18. The expandable structure of claim **17**, wherein:

the ball screw rod extends along the slot in each of the front and rear first side frame structures to terminate within the main structure;

the ball screw rod is generally linear when the expandable structure is in the expanded state; and

the ball screw rod is angled when the expandable structure is in the stowed state.

19. An expandable structure comprising:

a main structure;

a front first side frame structure foldable against the main structure in a stowed state and openable to extend outward from the main structure in an expanded state;

a rear first side frame structure foldable against the main structure in the stowed state and openable to extend outward from the main structure in the expanded state;

a plurality of front wall panels stored in a stacked arrangement in the main structure, each of the plurality of front wall panels movable along tracks to provide a front wall in the front first side frame structure;

a plurality of rear wall panels stored in a stacked arrangement in the main structure, each of the plurality of rear wall panels movable along tracks to provide a rear wall in the rear first side frame structure;

a retractable roof formed from a plurality of roof panels stored in the main structure when in the stowed state and deployable extend between the front first side frame structure and the rear first side frame structure to cover an expanded section formed in the expanded state;

a plurality of floor panels, stored in a stacked arrangement in the main structure, each of the plurality of floor panels movable along tracks to provide a floor spanning between the front first side frame structure and the rear first side frame structure when each are in the expanded state;

an outer wall disposed adjacent the main structure, inside each of the folded front and rear first side frame structures when in the stowed state;

slots formed along each of the front and rear first side frame structures; and

a ball screw rod disposed within each of the slots in each of the front and rear first side frame structures, wherein:

the ball screw rod extends along the slot in each of the front and rear first side frame structures to terminate within the main structure;

the ball screw rod is generally linear when the expandable structure is in the expanded state; and

the ball screw rod is angled when the expandable structure is in the stowed state.

20. The expandable structure of claim **19**, further comprising:

a front wall panel box storing the plurality of front wall panels in a stacked arrangement, the front wall panel box located adjacent a front face of the main structure; and

a rear wall panel box storing the plurality of rear wall panels in a stacked arrangement, the rear wall panel box located adjacent a rear face of the main structure.

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