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(54) **MATTRESS FOUNDATIONS, MATTRESS FOUNDATION KITS AND RELATED METHODS**

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(57) **ABSTRACT**

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Mattress foundations, mattress foundation kits, and related methods are disclosed. In some embodiments, a mattress foundation kit may include four frames, corner members, and at least one interior support member, and at least two deck panels. Each frame may include a first elongated member, a second elongated member, and a connective structure coupling the first elongated member to the second elongated member. Each corner member may be configured to couple a first end of an elongated member of a frame of the four frames to a second end of an elongated member of another frame. At least two frames may be configured to support an end of the at least one interior support member. Additionally, each deck panel may be sized and configured to extend at least partially over at least one frame of the four frames and the at least one interior support member.

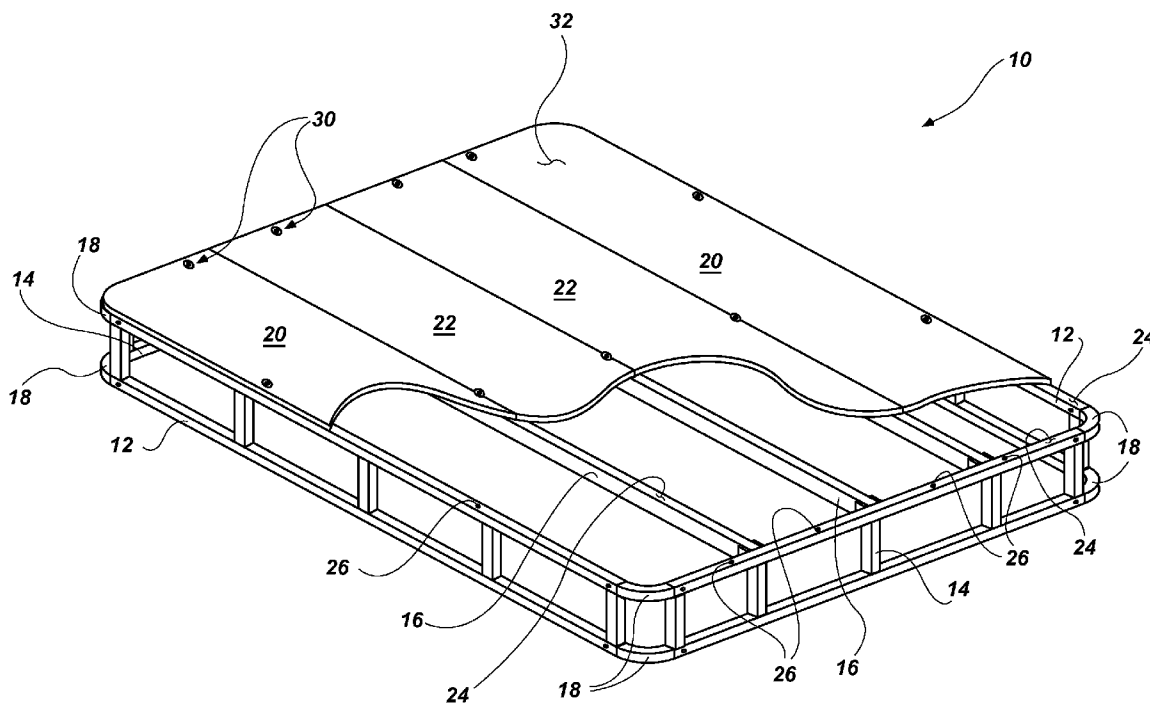
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(21) Appl. No.: **12/645,056**

(22) Filed: **Dec. 22, 2009**

Related U.S. Application Data

(60) Provisional application No. 61/203,335, filed on Dec. 22, 2008.



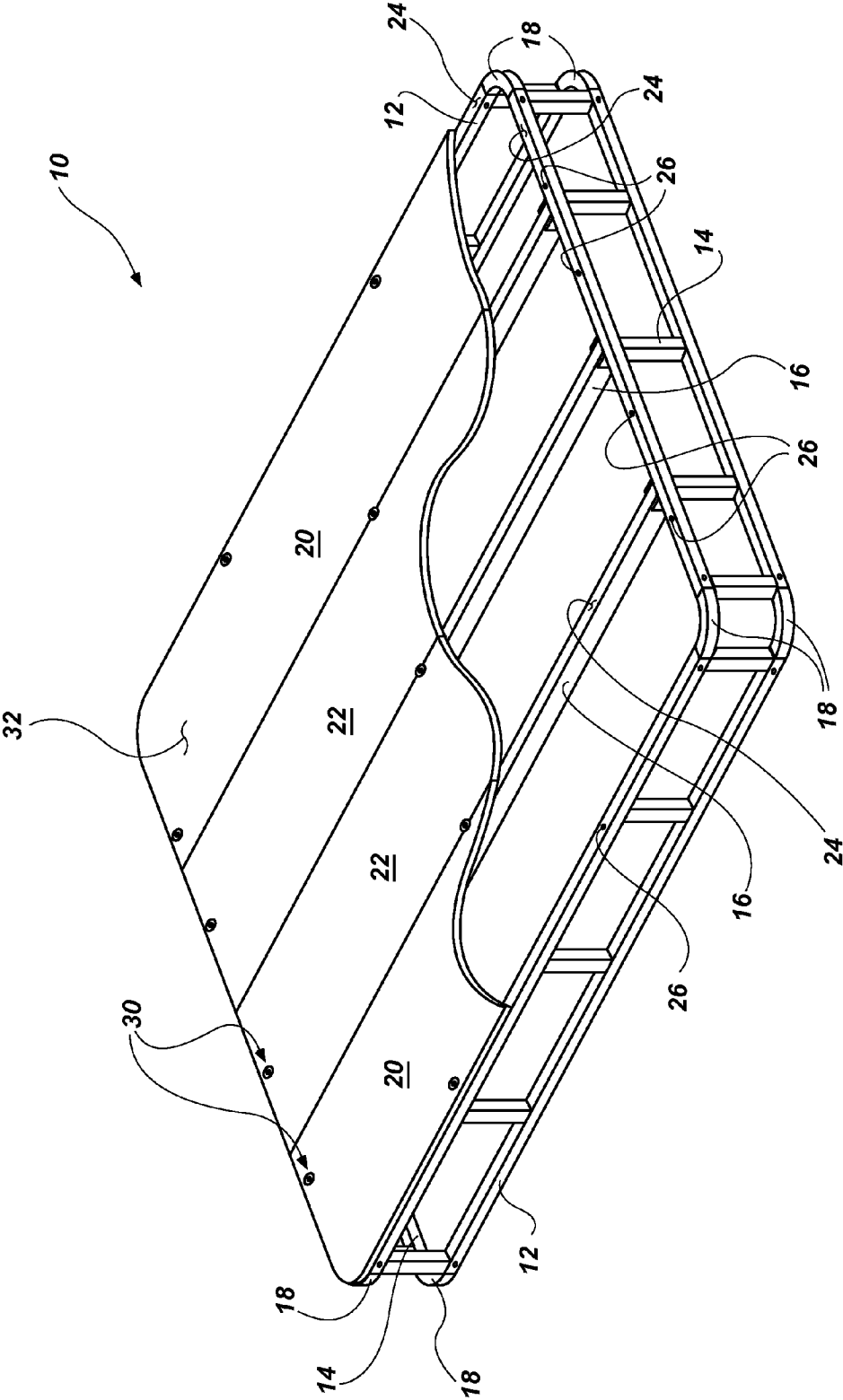


FIG. 1

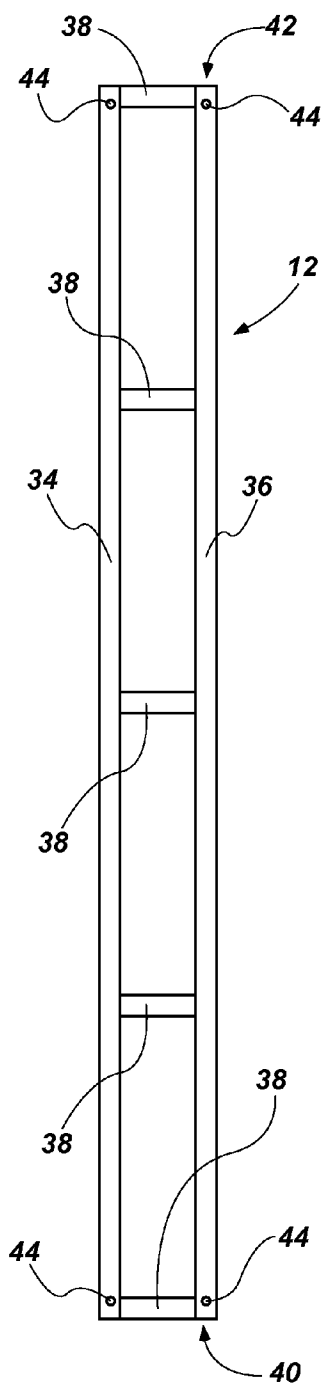


FIG. 2

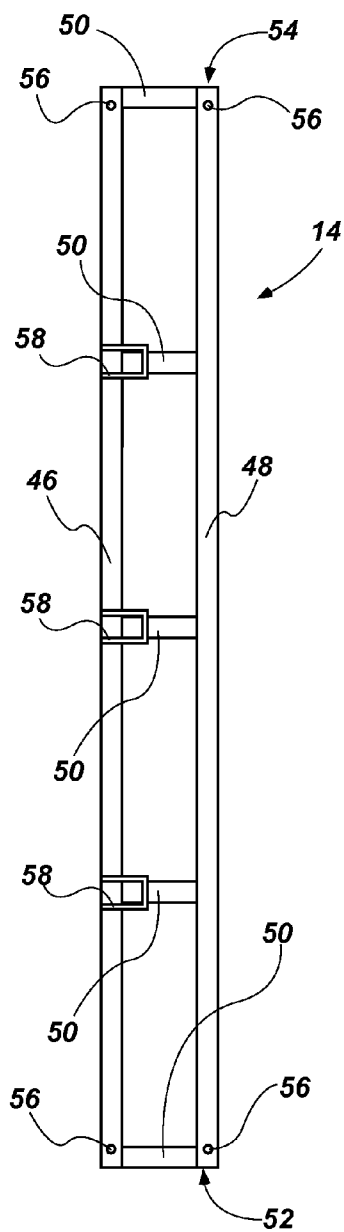


FIG. 3

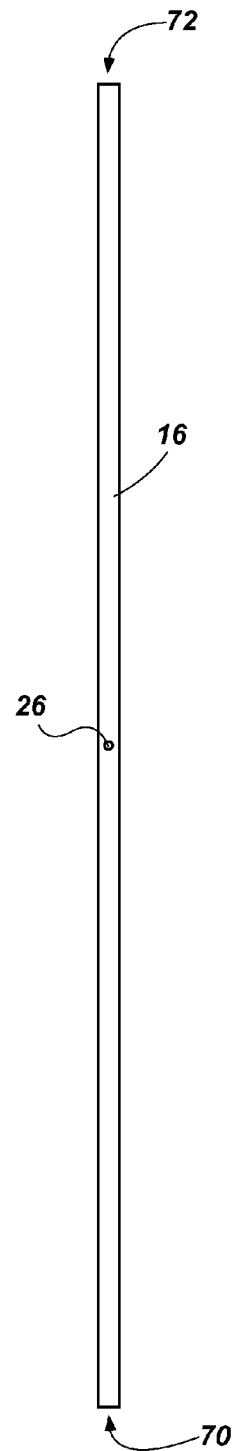
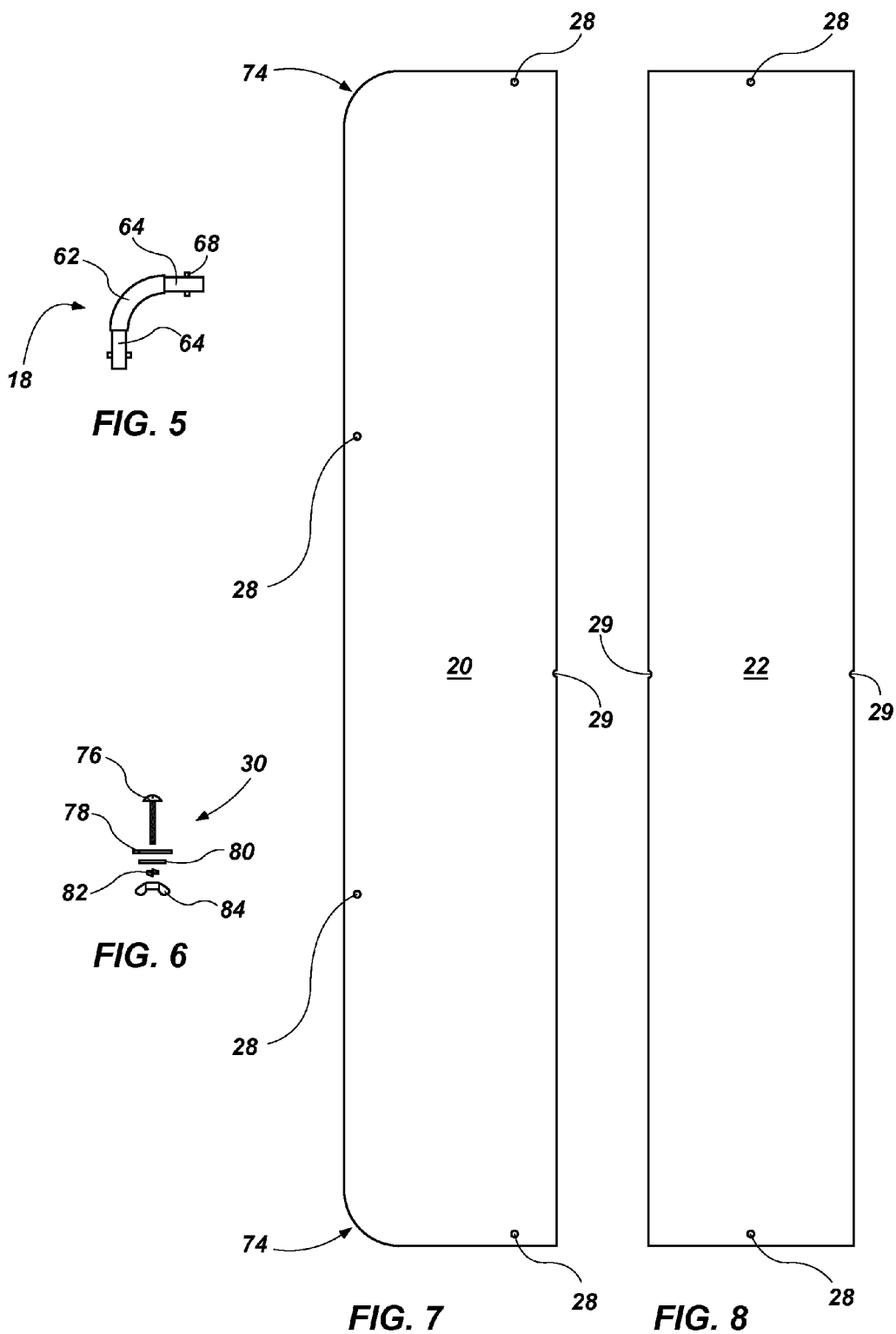


FIG. 4



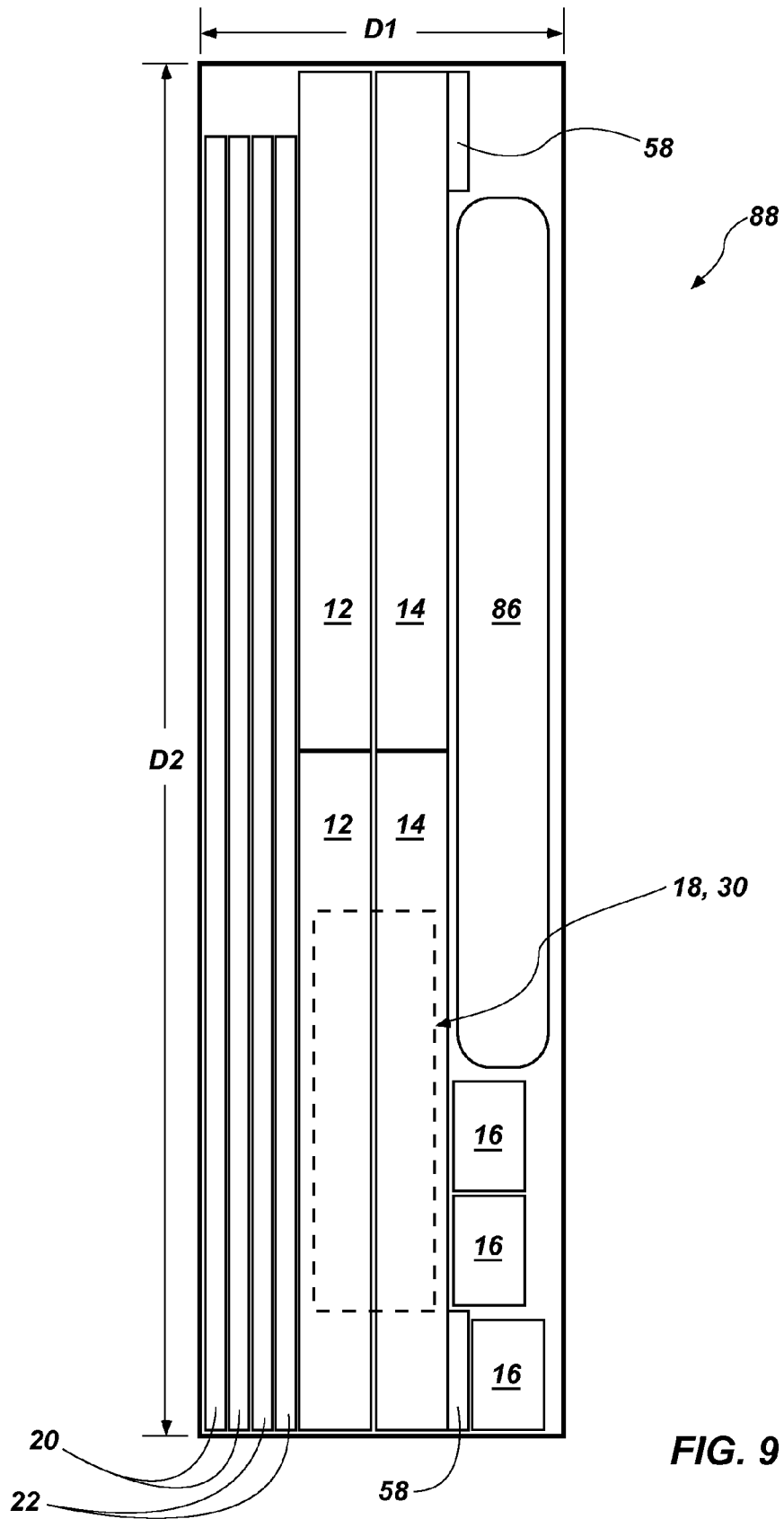
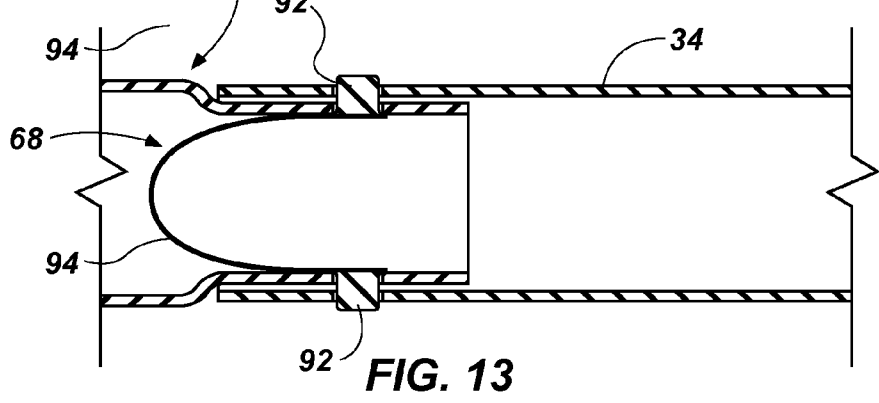
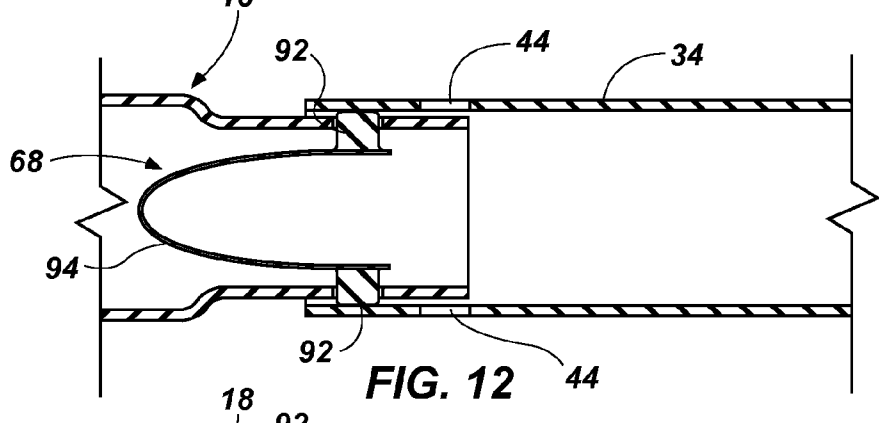
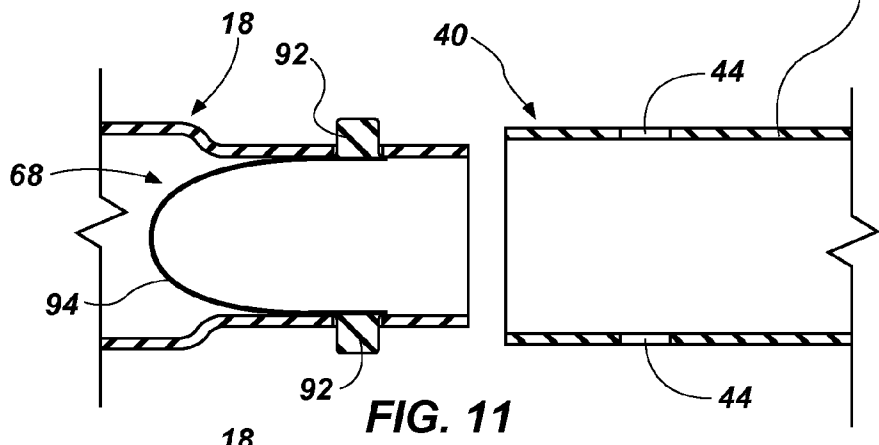
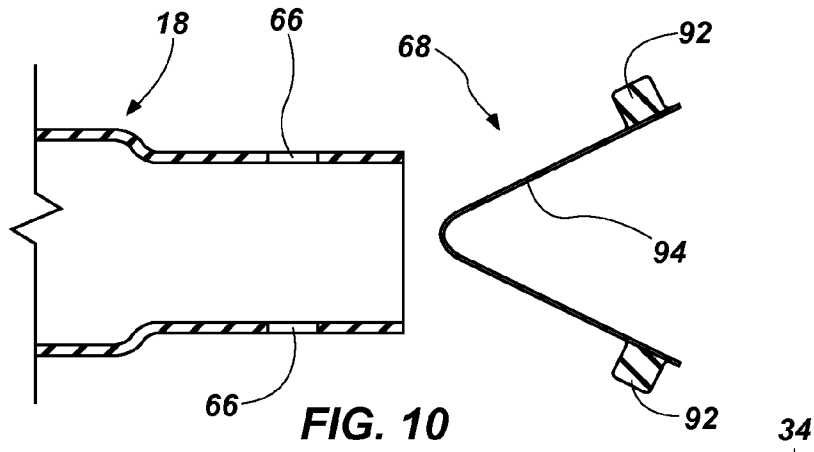


FIG. 9



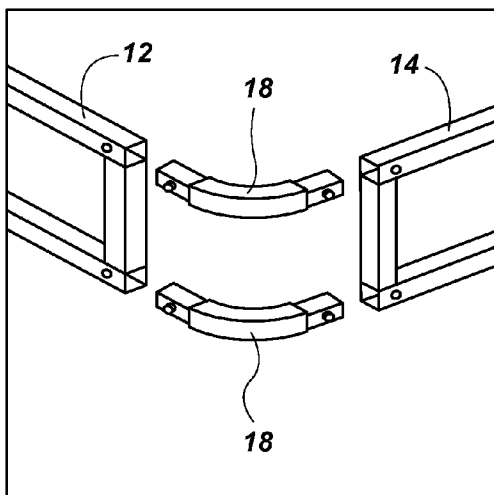


FIG. 14

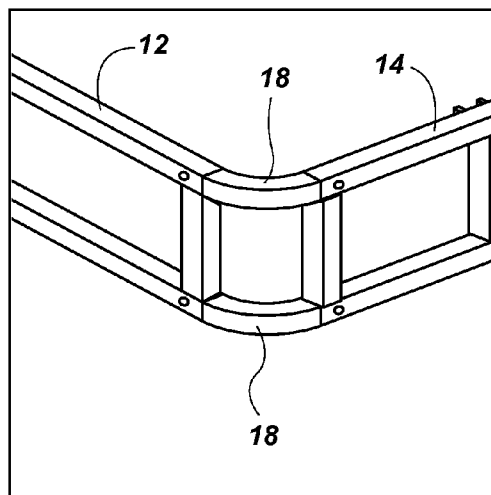


FIG. 15

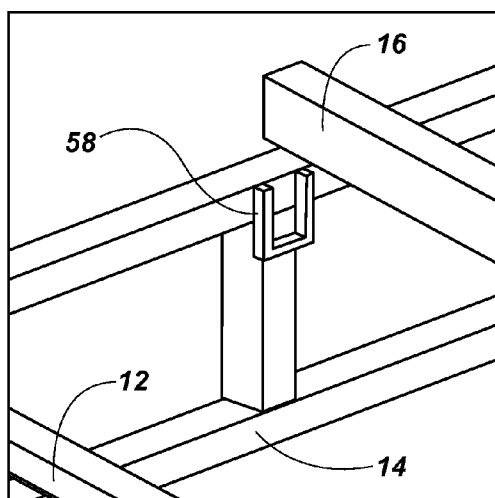


FIG. 16

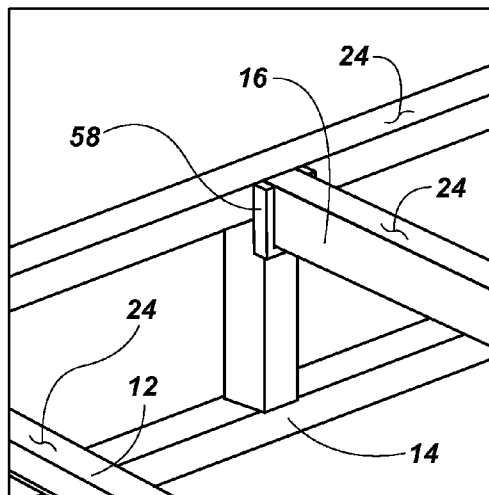


FIG. 17

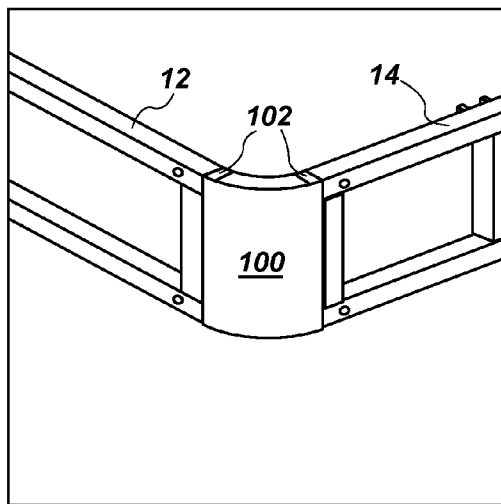


FIG. 18

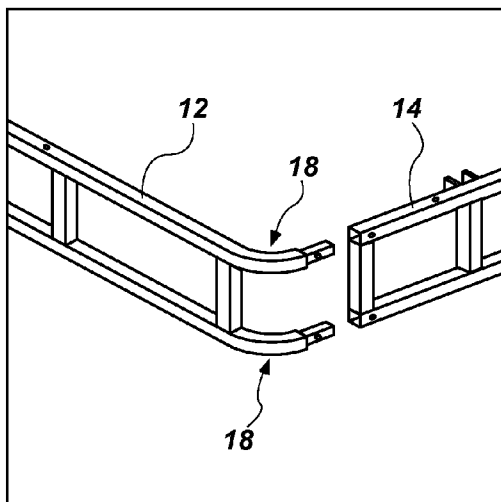


FIG. 19

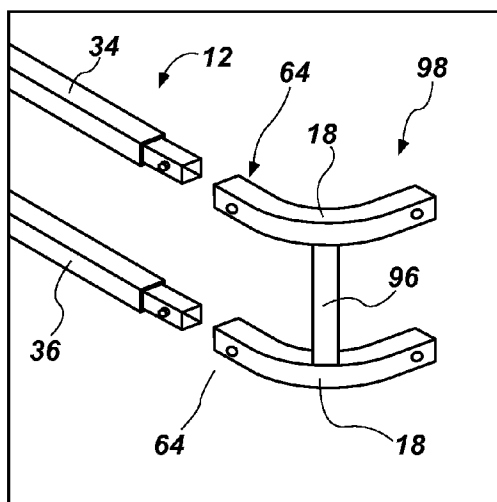


FIG. 20

MATTRESS FOUNDATIONS, MATTRESS FOUNDATION KITS AND RELATED METHODS

RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 61/203,335, which was filed on Dec. 22, 2008 in the name of Tony Marion Pearce, the disclosure of which is incorporated herein in its entirety by this reference.

BRIEF SUMMARY

[0002] In some embodiments, a mattress foundation kit may include four frames, at least four corner members, at least one interior support member, and at least two deck panels. Each frame may include a first elongated member having a first end and an opposing second end, a second elongated member positioned substantially parallel to the first elongated member and having a first end and an opposing second end, and a connective structure coupling the first elongated member to the second elongated member. The corner members may be configured to couple a frame of the four frames to another frame of the four frames. At least two of the four frames may be configured to support an end of each interior support member. Additionally, each deck panel may be sized and configured to extend at least partially over at least one frame of the four frames and the at least one interior support member.

[0003] In additional embodiments, a mattress foundation may include four frames, at least four corner members, at least one interior support member, and at least two deck panels. Each frame may include a first elongated member having a first end and an opposing second end, a second elongated member positioned substantially parallel to the first elongated member and having a first end and an opposing second end, and a connective structure coupling the first elongated member to the second elongated member. The corner members may couple the ends of each of the elongated members of the four frames to another of the elongated members of the four frames. Each support member may extend between and be supported by at least two frames of the four frames. Additionally, each deck panel may extend at least partially over and be supported by at least two of the four frames and the at least one interior support member.

[0004] In further embodiments, a method of transporting a mattress foundation may include positioning four frames, each frame comprising two parallel tubes coupled by a plurality of struts, within a shipping box having a combined width and girth less than about 130 inches. The method may further include positioning eight corner members, each corner member having end portions configured to couple with a tube of the four frames, within the shipping box. Additionally, at least one interior support member, the interior support member having a first end configured to couple with a frame of the four frames and a second end configured to couple with another frame of the plurality of frames, may be positioned within the shipping box. At least two deck panels configured to couple to at least two of the four frames and at least one interior support member may also be positioned within the shipping box, and the shipping box containing the four frames, the eight corner members, the at least one interior support member and the at least two deck panels may be transported to a point-of-use location.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

- [0005] FIG. 1 is an isometric, partial cut-away view of an embodiment of a mattress foundation of the invention.
- [0006] FIG. 2 is a side view of a side frame for a mattress foundation, such as that shown in FIG. 1.
- [0007] FIG. 3 is a side view of an end frame for a mattress foundation, such as that shown in FIG. 1.
- [0008] FIG. 4 is a top view of an interior support member for a mattress foundation, such as that shown in FIG. 1.
- [0009] FIG. 5 is a top view of a corner member for a mattress foundation, such as that shown in FIG. 1.
- [0010] FIG. 6 is an exploded view of a fastener assembly for a mattress foundation, such as that shown in FIG. 1.
- [0011] FIG. 7 is a top view of a side deck panel for a mattress foundation, such as that shown in FIG. 1.
- [0012] FIG. 8 is a top view of an intermediate deck panel for a mattress foundation, such as that shown in FIG. 1.
- [0013] FIG. 9 is a cross-sectional end view of a kit for a mattress foundation, such as that shown in FIG. 1, within a shipping container.
- [0014] FIG. 10 is a partial cross-sectional view of spring buttons positioned near an end portion of a corner member for a mattress foundation, such as that shown in FIG. 1.
- [0015] FIG. 11 is a partial cross-sectional view of spring buttons positioned within the end portion of the corner member of FIG. 10 and an end of an elongated member of a frame positioned near the end portion of the corner member.
- [0016] FIG. 12 is partial a cross-sectional view of the corner member partially positioned within the elongated member of the frame of FIG. 11.
- [0017] FIG. 13 is a partial cross-sectional view of the corner member positioned within the elongated member of the frame of FIG. 12 and coupled thereto.
- [0018] FIG. 14 is an isometric detail view of an end frame, a side frame and two corner members for a mattress foundation, such as that shown in FIG. 1.
- [0019] FIG. 15 is an isometric detail view of the end frame, the side frame and the two corner members of FIG. 14 coupled together.
- [0020] FIG. 16 is an isometric detail view of an end frame and interior support member for a mattress foundation, such as that shown in FIG. 1.
- [0021] FIG. 17 is an isometric detail view of the end frame and the interior support member of FIG. 15 coupled together.
- [0022] FIG. 18 is an isometric detail view of an assembled side frame, end frame and corner members for a mattress foundation, such as that shown in FIG. 15, which further includes a corner plate positioned over the corner members.
- [0023] FIG. 19 is an isometric detail view of an end frame and a side frame for a mattress foundation, such as that shown in FIG. 1, wherein the end frame further includes integral corner members.
- [0024] FIG. 20 is an isometric detail view of a side frame and a corner member assembly that includes two corner members joined by a strut for a mattress foundation, such as that shown in FIG. 1.

DETAILED DESCRIPTION

[0025] In some embodiments, such as shown in FIG. 1, a mattress foundation 10, which may be assembled from a kit, may include four frames 12, 14, including two side frames 12 and two end frames 14, interior support members 16, corner

members 18 and deck panels 20, 22, including side deck panels 20 and intermediate deck panels 22 (a portion of the deck panels 20, 22 are cut away in FIG. 1 to show the interior support members 16). The side frames 12 and end frames 14 may be joined by the corner members 18 such that the side frames 12 and end frames 14, in the assembled state, form a generally rectangular frame structure. The interior support members 16 may extend between at least two of the four frames 12, 14. For example, the interior support members 16 may extend between the end frames 14 and may be coupled to the end frames 14. Upper support surfaces 24 of the end frames 14, side frames 12 and interior support members 16 may be located in substantially the same plane and may include apertures 26 therethrough for receiving fasteners therein, as discussed in further detail below. The deck panels 20, 22 may be positioned over the upper support surfaces 24 of the end frames 14, side frames 12 and interior support members 16, and apertures 28 and grooves 29 (FIGS. 7 and 8) in the deck panels 20, 22 may be aligned with apertures 26 in the end frames 14 and side frames 12. Fasteners assemblies 30 may be positioned through the apertures 26, 28 and may couple the deck panels 20, 22 with the end frames 14, side frames 12, and interior support members 16 to form a substantially planar deck surface 32.

[0026] As shown in FIG. 2, the side frames 12 may include a first elongated member 34, a second elongated member 36, and a connective structure, such as a plurality of struts 38. The first elongated member 34 may be oriented substantially parallel to the second elongated member 36 and the struts 38 may extend therebetween, and may couple the first elongated member 34 to the second elongated member 36 to form a substantially rigid side frame 12. The first elongated member 34 and the second elongated member 36 may each comprise a hollow elongated tube having a first end 40 that includes a first opening and an opposing second end 42 that includes a second opening. The tube may be a commercially available tube, such as a steel or aluminum tube, and may have a cross-sectional shape that is generally circular, rectangular, etc. As a non-limiting example, the tube may be a steel tube having a rectangular cross-sectional shape, such as a square cross-sectional shape. The tube may have cross-sectional dimensions (e.g., a width and a height) of about 0.75 inch (about 20 mm). The tube may have an average wall thickness of about 18 gage (about 1.2 mm). As another non-limiting example, the tube may be a steel tube having a cross-section generally shaped as a rectangle, and may have a first cross-sectional dimension (e.g., a width) of about 0.75 inch (about 20 mm), a second cross-sectional dimension (e.g., a height) of about 1.5 inches (about 40 mm), and an average wall thickness of about 18 gage (about 1.2 mm). Each strut 38 may also include a tube positioned with the ends thereof abutting the first elongated member 34 and the second elongated member 36, respectively. Each strut 38 may be coupled to the first elongated member 34 and second elongated member 36, such as by a weld, and the ends of each strut 38 may be sealed by the first and second elongated members 34, 36, respectively. In some embodiments, such as that shown in FIGS. 1 and 2, a longitudinal axis of each strut 38 of the side frame 12 may be substantially parallel with a longitudinal axis of each of the other struts 38 of the side frame 12. Additionally, a longitudinal axis of each strut 38 of the side frame 12 may be oriented substantially perpendicular to a longitudinal axis of each of the first and second elongated members 34, 36 of the side frame 12.

[0027] The first elongated member 34 and second elongated member 36 may each include discrete coupling features 44, such as apertures. For example, the first and second elongated members may each include discrete coupling features 44 formed near the first ends and the second ends thereof for coupling the elongated members 34, 36 with the corner members 18. The first elongated member 34 may also include discrete coupling features, such as apertures 26 (FIG. 1), formed in the upper support surface 24 and extending through the first elongated member 34 for coupling the deck panels 20 with the first elongated member 34. Additionally, the side frames 12 may include a protective coating thereon, such as one or more of galvanizing, clear coating, powder coating and paint.

[0028] As shown in FIG. 3, the end frames 14 may be configured similarly to the side frames 12, and may include a first elongated member 46, a second elongated member 48, and a connective structure, such as a plurality of struts 50. The first elongated member 46 may be oriented substantially parallel to the second elongated member 48, and the struts 50 may be positioned therebetween. The struts 50 may couple the first elongated member 46 to the second elongated member 48 to form a rigid end frame 14. The first elongated member 46 and the second elongated member 48 may each include a tube having a first end 52 having a first opening and an opposing second end 54 having a second opening. The tube may be a commercially available tube, such as a steel or aluminum tube having a cross-section generally shaped as one or more of a circle, a square, and a rectangle, as discussed above in relation to the elongated members 34, 36 of the side frames 12. As a non-limiting example, the tube may be a steel tube having a cross-section generally shaped as a square and having a cross-sectional dimension of about 0.75 inch (about 20 mm) and an average wall thickness of about 18 gage (about 1.2 mm). As another non-limiting example, the tube may be a steel tube having a cross-section generally shaped as a rectangle, and may have a first cross-sectional dimension of about 0.75 inch (about 20 mm), a second cross-sectional dimension of about 1.5 inches (about 40 mm), and a wall thickness of about 18 gage (about 1.2 mm). Each strut 50 may also include a tube positioned with the ends thereof abutting the first elongated member 46 and the second elongated member 48. Each strut 50 may be coupled to the first elongated member 46 and the second elongated member 48, such as by a weld, and the ends of each strut 50 may be sealed by the first and second elongated members 46, 48. In some embodiments, such as shown in FIGS. 1 and 3, a longitudinal axis of each strut 50 of the end frame 14 may be substantially parallel with a longitudinal axis of each of the other struts 50 of the end frame 14. Additionally, a longitudinal axis of each strut 50 of the end frame 14 may be oriented substantially perpendicular to a longitudinal axis of each of the first elongated member 46 and second elongated member 50 of the end frame 14. The first elongated member 46 and second elongated member 48 may each include discrete coupling features 56, such as apertures. For example, the first and second elongated members 46, 48 may each include discrete coupling features 56, such as apertures, formed near the first ends 52 and the second ends 54 for coupling the end frame 14 with the corner members 18. Additionally, the first elongated member 46 may include discrete coupling features, such as apertures 26 (FIG. 1), formed in the upper support surface 24 and extending through the first elongated member 46 for coupling the deck panels 20, 22 with the elongated member 46.

[0029] The end frames 14 may additionally include coupling features for coupling the end frames 14 to the interior support members 16. In some embodiments, as shown in FIGS. 1 and 3, the end frames 14 may include brackets 58 that may have a generally U-shaped cross-section. For example, about 0.25 inch (about 6 mm) lengths of metal U-shaped channel may be welded to the first elongated member 46 of the end frames 14. In additional embodiments, the end frames 14 may include other discrete coupling features, such as apertures, for coupling the end frames 14 to the interior support members 16 with fasteners, such as bolts (not shown). Additionally, the end frames 14 may include a protective coating thereon, such as one or more of galvanizing, clear coating, powder coating and paint.

[0030] As shown in FIG. 4, the interior support members 16 may include a tube having a first end 70 configured to couple with an end frame 14 and a second end 72 configured to couple with another end frame 14. The tube may be a commercially available tube, such as a steel or aluminum tube having a cross-section generally shaped as one or more of a circle, a square, a rectangle, etc. As a non-limiting example, the tube may be a steel tube having a cross-section generally shaped as a square and having a cross-sectional dimension of about 1.25 inch (about 20 mm) and an average wall thickness of about 18 gage (about 1.2 mm). As another non-limiting example, the tube may be a steel tube having a cross-section generally shaped as a rectangle, and may have a first cross-sectional dimension of about 0.75 inch (about 20 mm), a second cross-sectional dimension of about 1.5 inches (about 40 mm), and an average wall thickness of about 18 gage (about 1.2 mm). The interior support members 16 may additionally include a discrete coupling feature, such as one or more apertures 26 formed therethrough, for coupling the interior support members 16 to the deck panels 20, 22, such as with a fastener assembly 30 as discussed in further detail below. Additionally, the interior support members 16 may include a protective coating thereon, such as one or more of galvanizing, clear coating, powder coating and paint.

[0031] As shown in FIG. 5, the corner members 18 may include a tubular member having an arcuate segment 62 and at least one substantially straight end segment 64. The arcuate segment 62 may be shaped generally as a circular arc subtending a right angle (i.e., about 90 degrees). As a non-limiting example, the arcuate segment 62 may be defined by a circular arc having a radius of about 3 inches (about 75 mm). In some embodiments, the substantially straight end segments 64 may have an outer dimension that is smaller than an inner dimension of an opening of the ends 40, 42, 52, 54 of the elongated members 34, 36, 46, 48 of the end frames 14 and side frames 12. As a non-limiting example, the end segments 64 may have a length of about 3 inches (about 75 mm). In some embodiments, the corner members 18 may be formed from a tube having a cross-sectional shape and size that is substantially similar to the elongated members 34, 36, 46, 48 of the end frames 14 and side frames 12. The tube may be a commercially available tube, such as a steel or aluminum tube having a cross-section generally shaped as one or more of a circle, a square, a rectangle, etc. As a non-limiting example, the tube may be a steel tube having a cross-section generally shaped as a square and having a cross-sectional dimension of about 0.75 inch (about 20 mm) and an average wall thickness of about 18 gage (about 1.2 mm). As another non-limiting example, the tube may be a steel tube having a cross-section generally shaped as a rectangle, and may have a first cross-

sectional dimension of about 0.75 inch (about 20 mm) a second cross-sectional dimension of about 1.5 inches (about 40 mm), and an average wall thickness of about 18 gage (about 1.2 mm). In some embodiments, the end segments 64 of the corner members 18 may include a portion having a reduced outer dimension to allow the end segments 64 to be inserted into the elongated members 34, 36, 46, 48 of the end frames 14 and side frames 12. For such embodiments, the ends of a tube may be swaged to reduce the outer dimension thereof or a tube having a smaller outer dimension may be inserted into the end of the tube and welded thereto to form the substantially straight end segments 64. Additionally, the central segment of the tube may be bent to form the arcuate segment 62 of the corner member 18.

[0032] In additional embodiments, the corner members 18 may be formed integrally with one or more of the side frames 12 and the end frames 14. For example, and as shown in FIG. 19, the corner members 18 may be integral with the side frames 12 and the corner members 18 may each have a single end segment 64 for coupling with the end frames 14.

[0033] In further embodiments, and as shown in FIG. 20, the corner members 18 may be joined, such as by one or more struts 96, to form four corner assemblies 98, each corner assembly including two corner members 18. In such embodiments, the side frames 12 and end frames 14 may include a reduced number of struts. In some embodiments, the side frames 12 and end frames 14 may each include a single strut. Additionally, as is shown in FIG. 19, the corner members and frames may be configured such that the elongated members 34, 36, 46, 48 of the end frames 14 and side frames 12 may be configured to slide within the end portions 64 of the corner members 18.

[0034] The end segments 64 may include apertures 66 (FIG. 10) formed therein. Spring buttons 68 may be positioned within and protrude through the apertures 66 for use in coupling the corner members 18 with the end frames 14 and side frames 12. Additionally, the corner members 18 may include a protective coating thereon, such as one or more of galvanizing, clear coating, powder coating and paint.

[0035] In some embodiments, the deck panels 20, 22 may be coupled to the upper support surfaces 24 of the end frames 14, side frames 12 and interior support members 16 with fastener assemblies 30, such as that shown in FIG. 6. The fastener assemblies 30 may each include a machine screw 76, a top flat washer 78, a bottom flat washer 80, a lock washer 82 and a nut 84. For a non-limiting example, the fastener assembly 30 may include a one-quarter ($\frac{1}{4}$) inch combination truss head screw, a top one inch flat washer, a bottom three-quarter ($\frac{3}{4}$) inch flat washer, a one-quarter ($\frac{1}{4}$) inch lock washer, and a one-quarter ($\frac{1}{4}$) inch wing nut. The machine screws 76 may be positioned through the apertures 26 in the end frames 14, side frames 12, interior support members 16 and within apertures 28 and grooves 29 of the deck panels 20, 22. The top flat washer 78 may be positioned on the shaft of the screw 76 and between the head of the screw 76 and a surface of the deck panels 20, 22. The bottom flat washer 80 may be positioned over the shaft of the screw 76 adjacent a surface of the end frames 14, side frames 12 or interior support members 16 that is opposite the upper support surface 24. The lock washer 82 may be positioned on the shaft of the screw 76 adjacent the bottom flat washer 80. Finally, the nut 84 may be positioned on the shaft of the screw 76 adjacent the lock washer 82.

[0036] As shown in FIG. 1, the deck panels 20, 22 may include two side deck panels 20 (FIG. 7) and one or more

intermediate deck panels **22** (FIG. **8**). The deck panels **20, 22** may comprise a sheet material such as one or more of plywood, corrugated plastic, and expanded sheet metal. As a non-limiting example, the sheet material may be a plywood sheet having an average thickness between about 7 mm and about 9 mm. As another non-limiting example, the sheet material may be a corrugated plastic sheet having an average thickness of about 10 mm. In some embodiments, the sheet material of the deck panels **20, 22** may have a shape and density such that one square meter weighs about 1.5 kg or less. The side deck panels **20, 22** may be sized and shaped to cover at least a portion of a side frame **12**, at least a portion of the end frames **14** and at least a portion of an interior support member **16**. The side deck panels **20** may include two corners **74** sized and configured to cover and substantially conform in shape to the corner members **18**. As a non-limiting example, two corners **74** of the side deck panels **20** may be rounded to define a circular arc having a radius of about 3 inches (about 75 mm). The intermediate deck panels **22** may have a substantially rectangular shape and may each be sized and shaped to cover at least a portion of at least two intermediate support members **16** and at least a portion of the end frames **14**. In some embodiments, the entire peripheral edge of each deck panel **20, 22** may be fully supported by the upper support surfaces **24** of one or more of the end frames **14**, side frames **12** and interior support members **16**. In additional embodiments, the entire peripheral edge of each deck panel **20, 22** may not be fully supported by the upper support surfaces **24**. For example, in some embodiments, a deck panel **20, 22** may be oriented substantially perpendicular to the interior support members **16** and a section of the peripheral edge of the deck panel **20, 22** may span between more than one interior support member **16** such that the peripheral edge is unsupported between the interior support members **16**.

[0037] Optionally, a cover **86** (shown schematically in FIG. **9**) may be positioned over the assembled mattress foundation **10**, and may be included in a mattress foundation kit that includes an assembled or unassembled mattress foundation **10**. In some embodiments, the cover **86** may be a textile cover that may be positioned over the mattress foundation **10**. The cover **86** may include an opening that may be at least partially closed upon positioning over the mattress foundation **10** to secure the cover to the mattress foundation **10**, such as by one or more of a zipper, hook and loop fasteners (i.e., VELCRO® fasteners), buttons, snaps, elastic webbing, and other textile closures. In additional embodiments, the cover **86** may be provided with clips for securing the cover **86** to the second elongated members **36, 48** of the side frames **12** and end frames **14**, respectively. In yet further embodiments, the cover **86** may be simply draped over the mattress foundation **10** (when assembled).

[0038] As shown in FIG. **9**, the components of the mattress foundation **10**, including the end frames **14**, side frames **16**, corner members **18**, deck panels **20, 22**, fastener assemblies **30** and optional cover **86**, may be included in a kit **88** that may be packaged in a shipping box **90**. The shipping box **90** may have a size, shape, and weight that enables the shipping box **90** to be shipped by standard shipping couriers, as discussed below.

[0039] In some embodiments, the shipping box **90** may have a generally rectangular shape (i.e., the shape of a rectangular prism), and may have a height, a length, and a width. The total sum of the length and the girth (the girth is the sum of the two widths and the two heights) may be about 130

inches or less in some embodiments of the invention. Referring to FIG. **9**, as a non-limiting example, the shipping box **90** may be configured for shipping a queen-size mattress foundation **10**, and may have a height **D1** of about 4 inches, a width **D2** of about 16.5 inches, and a length of about 79.4 inches (the length is not labeled in FIG. **9**, as the length extends perpendicular to the plane of the cross-sectional view of FIG. **9**), and a combined two times height **D1**, two times width **D2**, and length of about 120.4 inches. In embodiments in which the shipping box **90** is not a rectangular prism, the shipping box may have a combined length and lateral circumference (i.e., girth) of about 130 inches or less.

[0040] In some embodiments, as shown in FIG. **9**, the deck panels **20, 22** may be stacked at one lateral side of the shipping box **90**, and the side frames **12** may be positioned side by side adjacent the deck panels **20, 22**. The end frames **14** may be positioned side by side adjacent the side frames **12** and the coupling features (i.e., the brackets **58**) for coupling the end frames **14** to the interior support members **16** may be positioned away from the side frames **12**. Relatively small components, such as the corner members **18** and fastener assemblies **30**, may be positioned between the struts **38, 50** of the side frames **12** and end frames **14**. The interior support members **16** and the cover **86** may be positioned side by side in the shipping box **90** adjacent the end frames **14**. Additionally, packing materials (not shown), such as one or more of cardboard, paper, plastic and foam, may be positioned around and between the components of the kit **88** within the shipping box **90** to reduce movement of the components within the shipping box **90** and to prevent damage to the components.

[0041] In some embodiments, a kit **88** for a mattress foundation **10** as described herein may have a total weight of about 100 pounds or less. In additional embodiments, a kit **88** for a mattress foundation **10** as described herein may have a total weight of about 90 pounds or less. As a non-limiting example, a kit **88** that includes a mattress foundation **10** as illustrated in FIG. **1** and sized and configured for a queen-size mattress may weigh about 78 pounds when using steel tubing for the frames **12, 14**, the corner members **18**, and interior support members **16**, and when using plywood for the deck panels **20, 22**. A similar embodiment sized and configured for a king-sized mattress may weigh about 86 pounds. The weight may be even less if lower density materials are used, such as aluminum tubing for the frames **12, 14**, the corner members **18**, and interior support members **16**, and corrugated plastic for the deck panels **20, 22**.

[0042] In view of the relatively small size and weight of the mattress kits **88** described herein, the mattress kits **88** may be transported via courier services, such as UNITED PARCEL SERVICE® at their standard rates, which are substantially less expensive than their rates for oversize packages (for example, packages having more than 130 inches in length plus girth). The mattress kits **88** may also be transported with passenger vehicles, such as passenger cars, passenger vans and passenger sports-utility vehicles. Additionally, after using a mattress foundation **10**, the mattress foundation **10** may be disassembled for removal and transportation to a new location where it may be assembled again. A disassembled mattress foundation **10** boxed as a kit **88** may also allow a relatively large number of mattress foundations **10** to be stored in a warehouse or retail storeroom when compared to the space requirement for conventional box springs using to

support mattresses. Thus, embodiments of the present invention provide many advantages over conventional box springs used to support mattresses.

[0043] The mattress foundation 10 may be assembled at a point-of-use location, which may allow the mattress foundation 10 to be assembled in locations that may not be accessible with conventional box springs. If the mattress foundation kit 88 is contained within a shipping box 90, the kit 88 may be removed from the box 90. As shown in FIGS. 10 and 11, spring buttons 68 may be inserted into the ends of corner members 18 such that the button portions 92 of the spring buttons 68 extend through apertures 66 near the ends of the corner members 18, and the button portions 92 are biased into the apertures 66 by the spring portion 94. The ends of the corner members 18 then may be aligned with the openings in the ends 40, 42, 52, 54 of the elongated members 34, 36, 46, 48 of the side frames 12 and the end frames 14, respectively, as shown in FIGS. 11 and 14. Next, the button portions 92 of the spring buttons 68 may be pushed into the apertures 66 of the corner members 18 to facilitate insertion of the ends of the corner members 18 into the openings in the ends 40, 42, 52, 54 of the elongated members 34, 36, 46, 48 of the side frames 12 and the end frames 14, respectively, as shown in FIG. 12. Upon alignment of the button portions 92 of the spring buttons 68 with the coupling features 44, 56 of the frames 12, 14, the button portions 92 may be biased into the coupling features 44, 56 of the frames 12, 14 by the spring portion 94, as shown in FIGS. 13 and 15, which may secure the corner members 18 and frames 12, 14 together. Although spring buttons 68 are described for fastening the corner members 18 to the frames 12, 14, other fastener assemblies, such as screw and nut type fastener assemblies, may also be used.

[0044] After securing each of the corner members 18 with the side frames 12 and end frames 14, the interior support members 16 may be coupled to at least two opposing frames, such as to the opposing end frames 14. As shown in FIGS. 16 and 17, the ends 70, 72 of the interior support members 16 may be positioned at discrete coupling features of the end frames 14, and may be coupled to the end frames 14. For example, the ends 70, 72 of the interior support members 16 may be positioned within the U-shaped brackets 58 of the end frames 14. Upon coupling each of the interior support members 16 to the end frames 14, an upper support surface 24 of each of the end frames 14, side frames 12, and interior support members 16 may be positioned on substantially the same plane.

[0045] Next, the deck panels 20, 22 may be positioned on the upper support surfaces 24 of each of the end frames 14, side frames 12, and interior support members 16. As shown in FIG. 1, the edges of the deck panels 20, 22 may be positioned over the upper support surfaces 24 of each of the end frames 14, side frames 12, and interior support members 16. The apertures 28 in the deck panels 20, 22 may be aligned with apertures 26 in the side frames 12 and end frames 14, and grooves 29 at located at the seams between the deck panels 20, 22 may be aligned with apertures 26 of the interior support members 16. Screws 76 of the fastener assemblies 30 may then be positioned through the apertures 26, 28 and the fastener assemblies 30 may be utilized to couple the deck panels 20, 22 with the end frames 14, side frames 12, and interior support members 16 to form the deck surface 32. Upon installation, the deck panels 20, 22 may extend over the U-shaped brackets and secure the interior support members 16 within the U-shaped brackets 58 of the end frames 14.

[0046] Optionally, corner plates 100 may be positioned over the corner members 18 of the mattress foundation 10, such as shown in FIG. 20. The corner plates 100 may be placed over and substantially conform to the corner members 18 and cover an opening between the corner members 18 of the mattress foundation 10. The corner plates 100 may provide a curved surface at the corners of the mattress foundation 10 and may improve the appearance of the mattress foundation 10. For example, when a cover 86 is installed over the mattress foundation 10 the corner plates 100 may prevent the cover 86 from being dimpled or indented at the corners and may provide a relatively smooth corner surface. In some embodiments, the corner plates 100 may each be formed from sheet metal that may be bent to conform to the outer curvature of the corner members 18. Additionally, each corner plate 100 may include integral clips 102 that may hold the corner plate 10 over the corner members 18 of the mattress foundation 10. Optionally, the corner plates 10 may be fastened to the mattress foundation 10 by other fastening devices as will be recognized by persons having ordinary skill in the art.

[0047] Finally, the cover 86 may be positioned over the deck surface 32 and frames 12, 14 and optionally secured thereto. Upon assembly, the mattress foundation 10 may be positioned on a conventional bed frame (not shown) and utilized in a manner similar to a conventional box spring. Additionally, the mattress foundation 10 may be positioned directly on a floor (not shown) and a bed frame may not be utilized. In yet further embodiments, castor wheels or leg supports (not shown) may be attached directly to the mattress foundation 10 to support the mattress foundation above the surface of a floor without the use of a bed frame. In some embodiments, the mattress foundation may be completely assembled without the use of any tools.

[0048] Example Mattress Foundation Kits:

[0049] California King:

Overall assembled mattress foundation dimensions about 83.5×71.5×8.25 (inches).

Qty.	Description	Approximate Dimensions (inches)
2	side frame	77.5 × 8 × 0.75
2	end frame	65.5 × 8 × 1
4	interior support member	81.9 × 1.5 × 0.75
8	corner member	6 × 6 × 0.75
2	side deck panel	83.5 × 14.2 × 0.25
3	intermediate deck panel	83.5 × 14.2 × 0.25
16	spring buttons	—
18	fastener assembly	—
1	cover	—
1	shipping box	83.9 × 16.5 × 4

[0050] King:

Overall assembled mattress foundation dimensions about 79×75.5×8.25 (inches).

Qty.	Description	Approximate overall dimensions (inches)
2	side frame	73 × 8 × 0.75
2	end frame	69.5 × 8 × 1
4	interior support member	77.4 × 1.5 × 0.75

-continued

Qty.	Description	Approximate overall dimensions (inches)
8	corner member	6 × 6 × 0.75
2	side deck panel	79 × 15 × 0.25
3	intermediate deck panel	79 × 15 × 0.25
16	spring buttons	—
18	fastener assembly	—
1	cover	—
1	shipping box	79.4 × 16.5 × 4

[0051] Queen:

Overall assembled mattress foundation dimensions about 79×59.5×8.25 (inches).

Qty.	Description	Approximate overall dimensions (inches)
2	side frame	73 × 8 × 0.75
2	end frame	53.5 × 8 × 1
3	interior support member	77.4 × 1.5 × 0.75
8	corner member	6 × 6 × 0.75
2	side deck panel	79 × 14.8 × 0.25
2	intermediate deck panel	79 × 14.8 × 0.25
16	spring buttons	—
15	fastener assembly	—
1	cover	—
1	shipping box	79.4 × 16.5 × 4

[0052] Full-XL:

Overall assembled mattress foundation dimensions about 79×52.5×8.25 (inches).

Qty.	Description	Approximate overall dimensions (inches)
2	side frame	73 × 8 × 0.75
2	end frame	46.5 × 8 × 1
2	interior support member	77.4 × 1.5 × 0.75
8	corner member	6 × 6 × 0.75
2	side deck panel	79 × 17.4 × 0.25
1	intermediate deck panel	79 × 17.4 × 0.25
16	spring buttons	—
12	fastener assembly	—
1	cover	—
1	shipping box	79.4 × 17.9 × 4

[0053] Twin-XL:

Overall assembled mattress foundation dimensions about 79×37.5×8.25 (inches).

Qty.	Description	Approximate overall dimensions (inches)
2	side frame	73 × 8 × 0.75
2	end frame	31.5 × 8 × 1
2	interior support member	77.4 × 1.5 × 0.75
8	corner member	6 × 6 × 0.75
2	side deck panel	79 × 18.7 × 0.25
16	spring buttons	—
9	fastener assembly	—
1	cover	—
1	shipping box	79.4 × 19.2 × 4

[0054] Full:

Overall assembled mattress foundation dimensions about 73.5×52.5×8.25 (inches).

Qty.	Description	Approximate overall dimensions (inches)
2	side frame	67.5 × 8 × 0.75
2	end frame	46.5 × 8 × 1
2	interior support member	71.9 × 1.5 × 0.75
8	corner member	6 × 6 × 0.75
2	side deck panel	73.5 × 17.4 × 0.25
1	intermediate deck panel	73.5 × 17.4 × 0.25
16	spring buttons	—
12	fastener assembly	—
1	cover	—
1	shipping box	73.9 × 18 × 4

[0055] Twin:

Overall assembled mattress foundation dimensions about 73.5×37.5×8.25 (inches).

Qty.	Description	Approximate overall dimensions (inches)
2	side frame	67.5 × 8 × 0.75
2	end frame	31.5 × 8 × 1
2	interior support member	71.9 × 1.5 × 0.75
8	corner member	6 × 6 × 0.75
2	side deck panel	73.5 × 18.7 × 0.25
16	spring buttons	—
9	fastener assembly	—
1	cover	—
1	shipping box	73.9 × 19.1 × 4

[0056] Embodiments of the invention may be susceptible to various modifications and alternative forms. Specific embodiments have been shown in the drawings and described in detail herein to provide illustrative examples of embodiments of the invention. However, the invention is not limited to the particular forms disclosed herein. Rather, embodiments of the invention may include all modifications, equivalents, and alternatives falling within the scope of the invention as defined by the following appended claims. Furthermore, elements and features described herein in relation to some embodiments may be implemented in other embodiments of the invention, and may be combined with elements and features described herein in relation to other embodiments to provide yet further embodiments of the invention.

What is claimed is:

1. A mattress foundation kit, comprising:

four frames, each frame comprising:

a first elongated member having a first end and an opposing second end;

a second elongated member positioned substantially parallel to the first elongated member and having a first end and an opposing second end; and

a connective structure coupling the first elongated member to the second elongated member;

at least four corner members configured to couple a frame of the four frames to another frame of the four frames;

at least one interior support member;

at least two of the four frames configured to support an end of the at least one interior support member; and

- at least two deck panels, each sized and configured to extend at least partially over at least one frame of the four frames and the at least one interior support member.
- 2.** The mattress foundation kit of claim **1**, wherein corner members of the at least four corner members are integral to at least two of the four frames.
- 3.** The mattress foundation kit of claim **1**, further comprising four corner assemblies, each of the four corner assemblies comprising two corner members of the at least four corner members coupled together.
- 4.** The mattress foundation kit of claim **1**, wherein the at least four corner members configured to couple a frame of the four frames to another frame of the four frames comprise:
- four first corner members, each configured to couple a first end of a first elongated member of a frame of the four frames to a second end of a first elongated member of another frame of the four frames; and
 - four second corner members, each configured to couple a first end of a second elongated member of a frame of the four frames to a second end of a second elongated member of another frame of the four frames.
- 5.** The mattress foundation kit of claim **1**, wherein the first elongated member and the second elongated member each comprise an elongated tube and the first end and opposing second end comprise openings of the elongated tube.
- 6.** The mattress foundation kit of claim **5**, wherein each of the four first corner members and the four second corner members comprise a first end and a second end, each sized and configured for at least one of insertion into the openings of the elongated tubes of the four frames and positioning over the ends of the elongated tubes of the four frames.
- 7.** The mattress foundation kit of claim **6**, wherein each of the four first corner members and the four second corner members comprises:
- an arcuate segment shaped generally as a circular arc subtending a right angle; and
 - at least substantially straight end segments.
- 8.** The mattress foundation kit of claim **7**, wherein the at least substantially straight end segments include apertures formed therein sized and configured to receive spring buttons therein.
- 9.** The mattress foundation kit of claim **8**, wherein each of the first elongated members and second elongated members of the four frames include apertures sized and configured to receive spring buttons therein.
- 10.** The mattress foundation kit of claim **1**, wherein the at least two of the four frames configured to support an end of the at least one interior support member further comprise at least one discrete coupling feature for coupling to an end of the at least one interior support member.
- 11.** The mattress foundation kit of claim **10**, wherein the at least one discrete coupling feature of the at least two of the four frames for coupling to an end of the at least one interior support member comprises a bracket having a U-shaped cross-section.
- 12.** The mattress foundation kit of claim **11**, wherein the at least two deck panels are each further sized and configured to extend over the bracket having a U-shaped cross-section to maintain the at least one interior support member within the bracket having a U-shaped cross-section.
- 13.** The mattress foundation kit of claim **1**, wherein the connective structure comprises a plurality of struts.
- 14.** The mattress foundation kit of claim **13**, wherein each of the first elongated member, the second elongated member and the plurality of struts of the four frame members comprises metal tubing having substantially the same cross-sectional shape and size.
- 15.** The mattress foundation kit of claim **14**, wherein each of the plurality of struts is positioned substantially perpendicular to the first elongated member and the second elongated member.
- 16.** The mattress foundation kit of claim **1**, further comprising a textile cover.
- 17.** The mattress foundation kit of claim **16**, wherein the textile cover comprises at least one of a zipper, hook and loop fasteners, buttons, snaps, elastic webbing and clips, for securing the textile cover over the four frames.
- 18.** The mattress foundation kit of claim **1**, wherein the four frames are sized and configured for supporting at least one of a California king-sized mattress, a king-sized mattress, a queen-sized mattress, a full-XL-sized mattress, a twin-XL-sized mattress, a full-sized mattress, and a twin-sized mattress, when the four frames are assembled together.
- 19.** The mattress foundation kit of claim **18**, wherein the four frames are sized and configured for mounting on at least one of a California king-sized bed frame, a king-sized bed frame, a queen-sized bed frame, a full-XL-sized bed frame, a twin-XL-sized bed frame, a full-sized bed frame, and a twin-sized bed frame, when the four frames are assembled together.
- 20.** The mattress foundation kit of claim **19**, wherein the four frames, at least four corner members, at least one interior support member and at least two deck panels are sized and configured to be entirely disposed within a shipping box having a combined length and cross-sectional circumference of about 130 inches or less, when the four frames are disassembled.
- 21.** The mattress foundation kit of claim **1**, wherein the four frames, at least four corner members, at least one interior support member and at least two deck panels are sized and configured to be entirely disposed within a shipping box having a combined length and cross-sectional circumference of about 130 inches or less, when the four frames are disassembled.
- 22.** The mattress foundation kit of claim **1**, wherein the at least two deck panels are comprised of at least one of plywood, corrugated plastic, and expanded sheet metal.
- 23.** The mattress foundation kit of claim **1**, wherein each of the first elongated member, and the second elongated member of the four frames, the four first corner members, the four second corner members, and the interior support member comprises a metal tube.
- 24.** The mattress foundation kit of claim **23**, wherein the metal tube is a metal tube having a generally rectangular cross-section.
- 25.** The mattress foundation kit of claim **1**, wherein the mattress foundation kit weighs about 100 pounds or less.
- 26.** The mattress foundation kit of claim **1**, further comprising four corner plates configured to be positioned over and generally conform in shape to two of the at least four corner members when the mattress foundation kit is assembled to form a mattress foundation.
- 27.** The mattress foundation kit of claim **1**, wherein the at least two deck panels, are further sized and configured such

that substantially the entire peripheral edge of each of the at least two deck panels overlies and is supported by an upper support surface of one or more of the four frames and the at least one interior support member when the mattress foundation kit is assembled to form a mattress foundation.

28. A mattress foundation, comprising:

four frames, each frame comprising:

a first elongated member having a first end and an opposing second end;

a second elongated member positioned substantially parallel to the first elongated member and having a first end and an opposing second end; and

a connective structure coupling the first elongated member to the second elongated member;

at least four corner members coupling the ends of each of the elongated members of the four frames to another of the elongated members of the four frames;

at least one interior support member extending between and supported by at least two frames of the four frames; and

at least two deck panels, each of the at least two deck panels extending at least partially over and supported by at least two of the four frames and the at least one interior support member.

29. A method of transporting a mattress foundation comprising:

positioning four frames, each frame comprising two parallel tubes coupled by a plurality of struts, within a shipping box having a combined width and girth less than about 130 inches;

positioning eight corner members, each corner member having end portions configured to couple with a tube of the four frames, within the shipping box;

positioning at least one interior support member, the interior support member having a first end configured to couple with a frame of the four frames and a second end configured to couple with another frame of the plurality of frames, within the shipping box;

positioning at least two deck panels configured to couple to the four frames and at least one interior support member within the shipping box; and

transporting the shipping box containing the four frames, the eight corner members, the at least one interior support member and the at least two deck panels to a point-of-use location.

30. The method of claim **29**, wherein transporting the shipping box further comprises transporting the shipping box by a courier service.

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