April 21, 1970 F. A. BIELAK 3,506,987

BOX SPRING FRAME ASSEMBLY

Filed Aug. 21, 1967 4 Sheets-Sheet 1

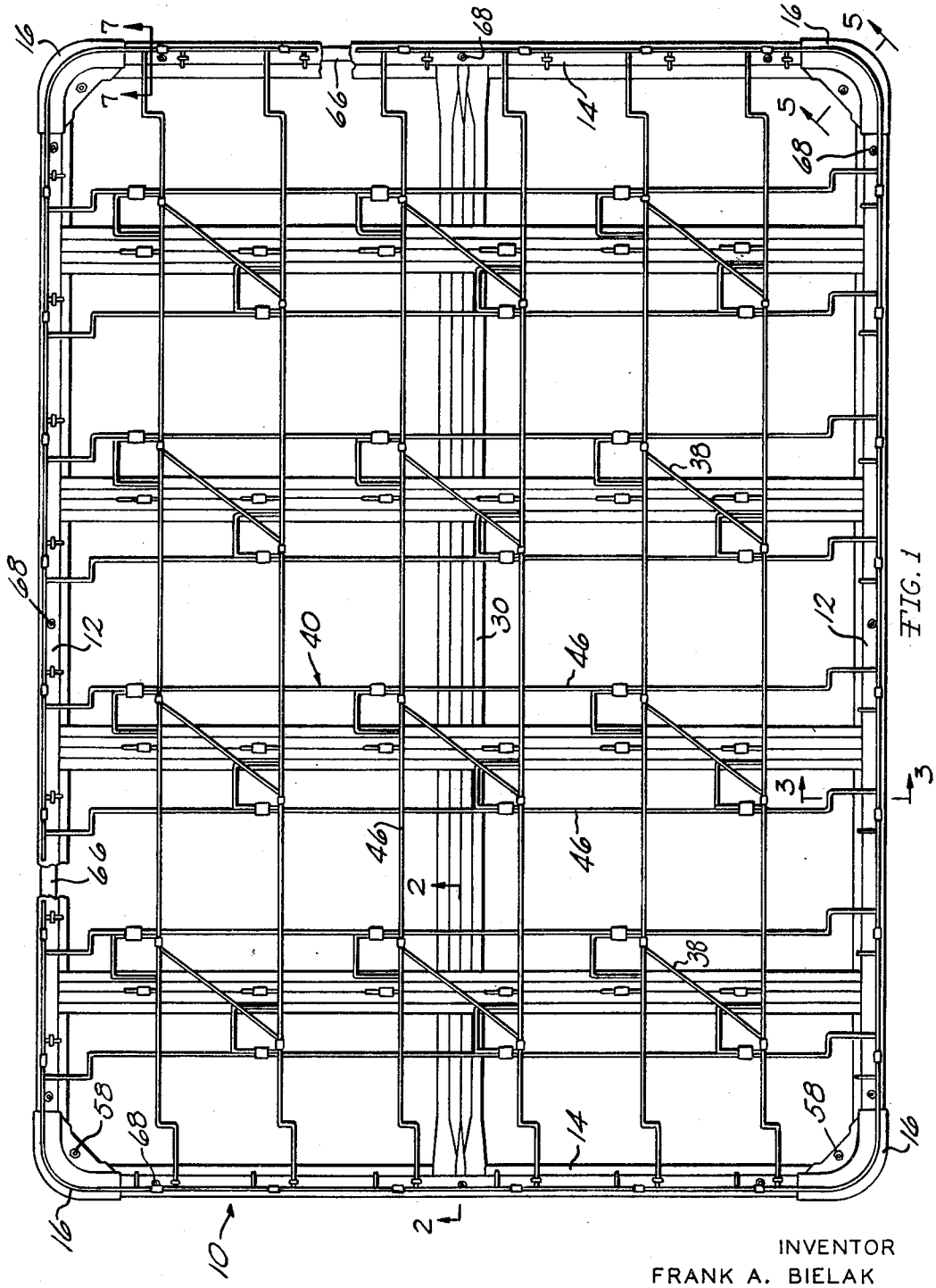



FIG. 1

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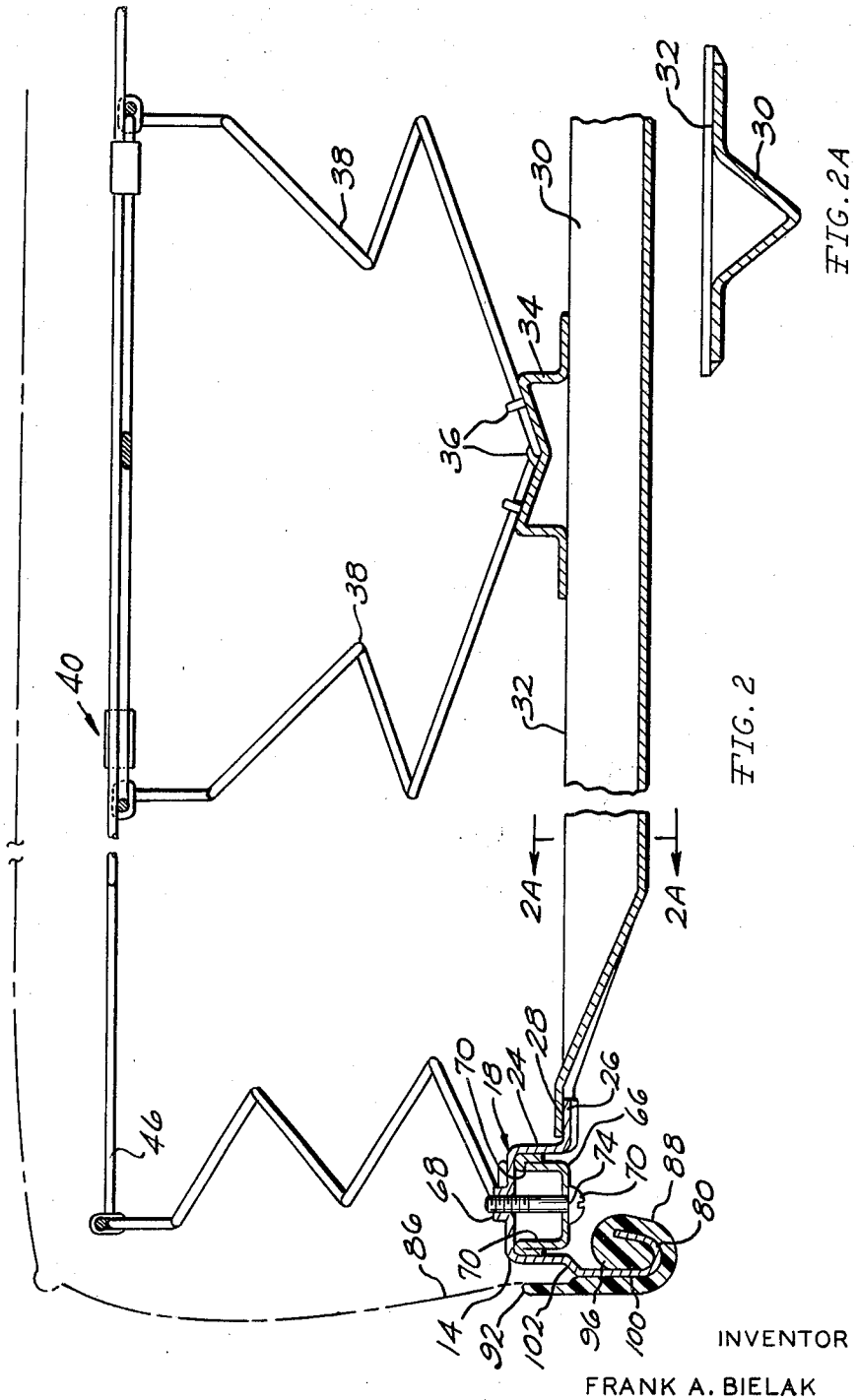



FIG. 2A

FIG. 2

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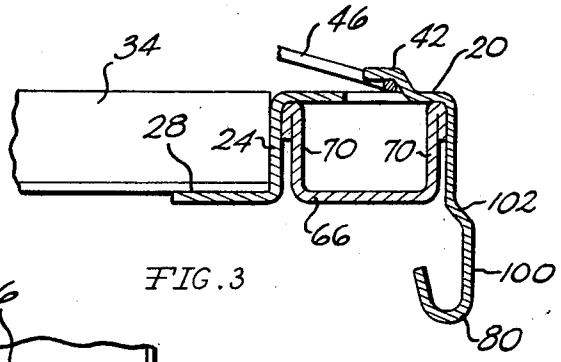



FIG. 3

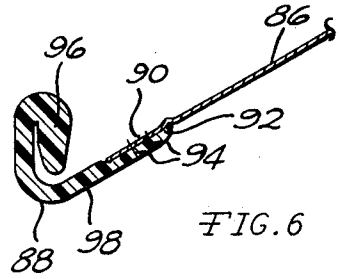



FIG. 6

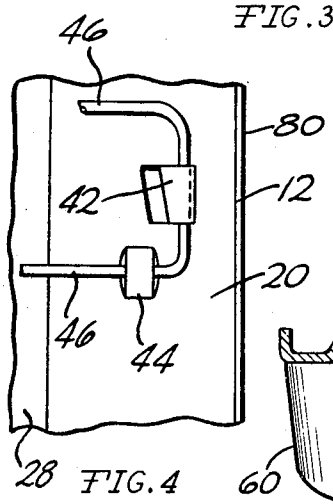



FIG. 4

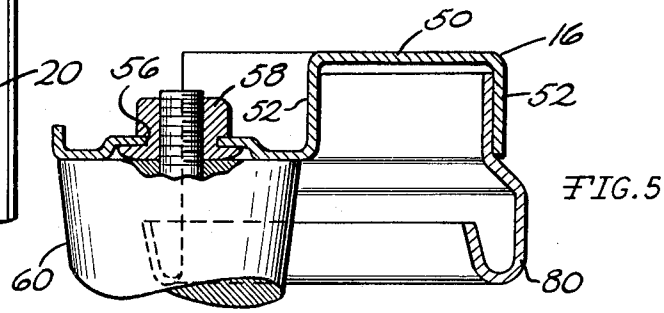



FIG. 5

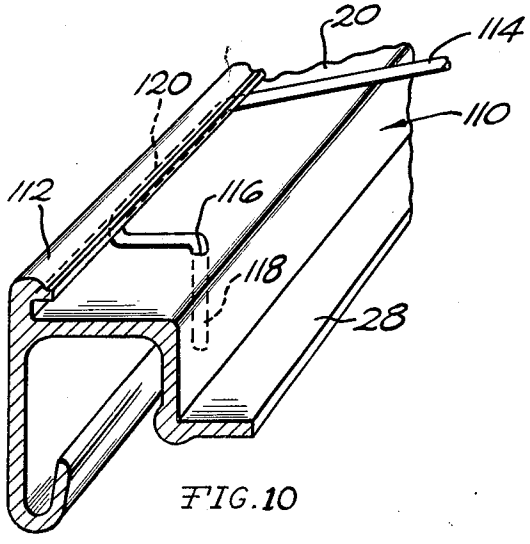



FIG. 10

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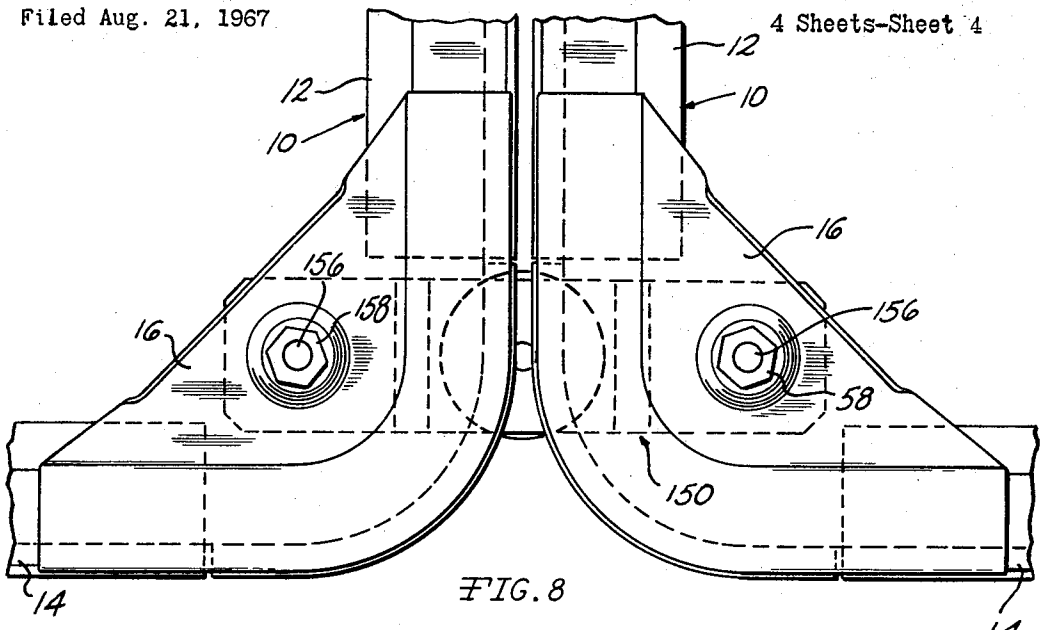



FIG. 8

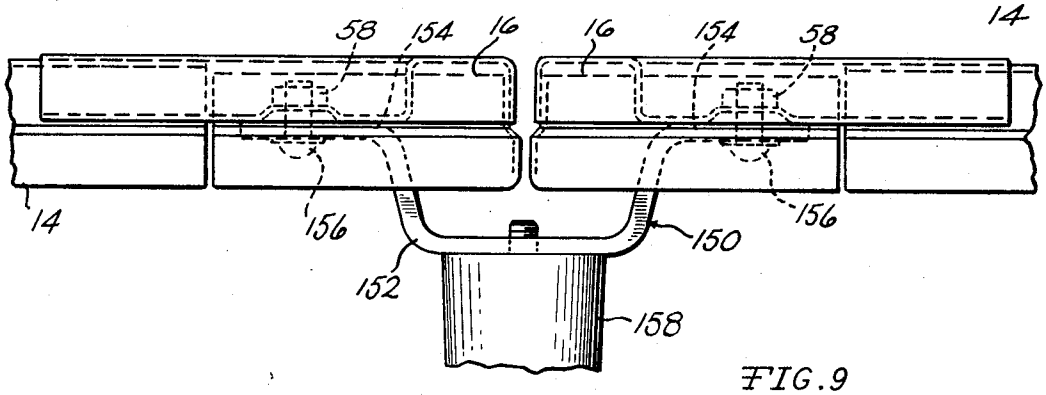
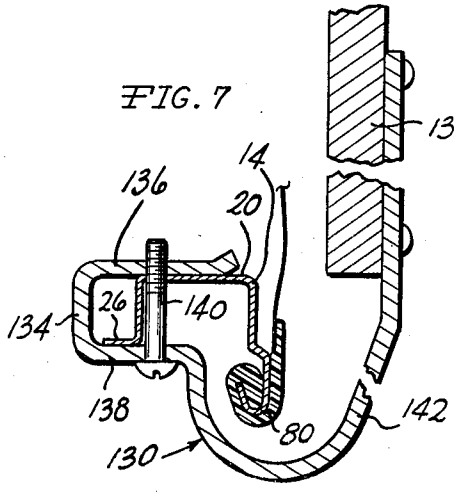



FIG. 9

FIG. 7




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3,506,987

# BOX SPRING FRAME ASSEMBLY

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Int. Cl. A47c 19/00
U.S. Cl. 5—203 11 Claims

## ABSTRACT OF THE DISCLOSURE

A box spring frame assembly consisting of four corner members and four rails which can be of any desired length so as to form a frame of desired size such as double bed size, king size, queen size, twin size, etc., and wherein the rails are of a shape in cross section to achieve a high strength to weight ratio. The rails are shaped so that they can be formed of any desired structural material such as metal or plastic and form supports for the springs and for the internal spring support members in the frame. Reinforcing bars can readily be attached to the rails for converting to a heavy duty frame that can also function as the primary bed support when legs are attached to the frame corner members, and two frames can be arranged side by side and connected by leg supports to form a king size box spring frame. Headboard mounting brackets can be attached directly to an end rail when the frame is used as a "Hollywood bed." The rails are also shaped to provide for the unique attachment thereto of the usual box spring fabric cover.

## CROSS REFERENCE TO RELATED APPLICATION

The frame of this invention is particularly adapted for supporting box spring assemblies of the type shown in copending application Ser. No. 644,358 filed June 7, 1967 owned by the assignee of this application.

## BACKGROUND OF THE INVENTION

Box spring frames are conventionally formed of wood. A number of wood pieces are nailed together so as to form a generally rectangular frame having transverse cross supports. Coil springs are suported on the cross supports and the frame, a padding is applied over the coil springs, and a cover is placed over the padding and nailed to the frame. The box spring is then supported either on a conventional bed frame or, in the case of a Hollywood bed, on a metal angle iron frame to which a headboard is attached. It is becoming increasingly difficult to obtain low cost lumber of sufficiently high quality to form wooden box spring frames which will not either split during fabrication or fail in use. In any case, these wooden frames are seldom of sufficient strength to provide the primary bed support, such as when legs are attached directly to the box spring frame. A box spring frame assembly which can be manufactured from structural materials such as metal and which can be adapted for use as the primary bed support is thus desirable.

## SUMMARY OF THE INVENTION

This invention provides a box spring frame assembly which is formed of a structural material such as metal or plastic and which consists of four corner members, side rails, and end rails which are secured, such as by welding, to the corner members. The rails are substantially straight structural members which can be provided in any desired size to thus achieve any one of a number of desired box spring frame sizes. The rails are shaped so that they provide a high strength to weight ratio, thereby enabling manufacture of box spring assemblies



of lighter than conventional weight but which also have the desired strength characteristics. Each rail has a section which is of a substantially inverted U-shape in cross section, and auxiliary reinforcing bars are provided which can readily be attached to the rails at the point of sale of the box spring so that at the time of purchase, a box spring assembly can readily be adapted to form the primary bed support. Each rail is provided with an integral flange on which the internal spring support members are mounted and an integral attaching means for the box spring cover.

Extruded plastic strips are sewn to the box spring cover along the lower periphery thereof. These strips which are readily frictionally interlocked with the frame to quickly assemble the cover with the frame. The strips positively lock the cover to the frame and provide anti-noise insulation when the frame is mounted on a conventional bed frame. The strips also prevent wear of the cover material at the points which contact the bed frame and provide a clean cut appearance along the lower edge of the box spring.

It is an object of this invention, therefore, to provide an improved box spring frame assembly.

Further objects, features and advantages of this invention will become apparent from a consideration of the following description, the appended claims, and the accompanying drawing in which:

FIGURE 1 is a plan view of a box spring provided with the frame assembly of this invention, the box spring cover and padding being removed, and portions of the frame being broken away for purposes of clarity;

FIGURE 2 is an enlarged fragmentary sectional view of the box spring shown in FIG. 1, as seen from substantially the line **2**—**2** in FIG. 1;

FIGURE 2A is a detail sectional view of one of the structural members in the box spring frame assembly of this invention, as seen from substantially the line 2A—2A in FIG. 2;

FIGURE 3 is an enlarged transverse sectional view of a portion of the frame assembly of this invention, as seen from substantially the line **3**—**3** in FIG. 1;

FIGURE 4 is a fragmentary plan view of the structure illustrated in FIG. 3;

FIGURE 5 is an enlarged transverse sectional view of a corner member in the frame assembly of this invention, looking substantially along the line **5**—**5** in FIG. 1;

FIGURE 6 is a detail sectional view illustrating the assembly of the box spring fabric cover with a cover attaching member, in the frame assembly of this invention;

FIGURE 7 is an enlarged sectional view of the frame assembly of this invention as seen from substantially the line **7**—**7** in FIG. 1, showing the attachment thereto of a headboard supporting bracket;

FIGURE 8 is a fragmentary plan view of a pair of adjacent frames of this invention connected together;

FIGURE 9 is a fragmentary elevational view of the structure shown in FIG. 8; and

FIGURE 10 is a fragmentary perspective view of a modified form of rail in the frame of this invention showing the assembly therewith of a spring in a box spring assembly.

With reference to the drawing, the box spring frame assembly of this invention, indicated generally at **10**, is illustrated in FIG. 1 as including a pair of side rails **12**, a pair of end rails **14**, and four corner members **16**, each of which is connected to and extended between the adjacent ends of adjacent rails **12** and **14**. The rails **12** and **14** are identically shaped to facilitate production of the rails, each rail including an inverted U-shaped section **18** (FIG. 2) provided with a substantially horizontal top

surface 20 and horizontally spaced depending portions 22 and 24. The depending portions 22 and 24 are disposed in substantially upright planes and function as stiffening webs to resist vertical deflection of the rails. The inner web 24 is provided with an integral inwardly extending flange 26 having a substantially horizontal top surface 28.

As shown in FIGS. 1 and 2, a structural member or beam 30 is supported on and extended between the surfaces 28 on the end rails 14 at a position substantially midway between the side rails 12. The beam 30 is illustrated as being of a substantially V-shape in transverse section (FIG. 2A) having a top surface 32 which is in substantially horizontal alignment with the supporting surface 28 on the side rails 12, but it is to be understood that the beam 30 can be of other suitable shapes. The purpose of the beam 30 is to provide an intermediate support for transversely extending internal spring support members 34 which are secured to and extend between the surfaces 28 on the side rails 12. As shown in FIG. 2, an internal spring support member 34 is integrally formed with spring attaching projections 36 on which the internal springs 38 in the box spring assembly, indicated generally at 40, are mounted. As shown in FIGS. 3 and 4, the rails 12 and 14 are also formed with upwardly extending tabs 42 and tunnels 44 for attaching the main springs 46 in the assembly 40 directly to the rails 12 and 14. It is to be understood that the support members 34 can also be formed of wood and a larger number than the illustrated four members 34 can be used in the event it is desired to support opposite ends of the springs 38 on different support members. It is also be understood that the frame 10 can be adapted for the support of coil springs by providing suitable spring retainers on the frame 10.

It can thus be seen that the rails 12 and 14 are provided with the tabs 42 and the tunnels 44 for attaching the box spring assembly 40 directly to the rails without the requirement of any additional attaching means. It is to be understood that the tabs 42 and tunnels 44 are merely illustrative of this means, there being other well known means for attaching the spring assembly 40 directly to the rails. In addition, the end rails 14 provide a support for the intermediate beam 30 on which the internal spring support members 34 are supported intermediate their ends, the ends of the members 34 being supported on and secured to the surfaces 28 on the side rails 12. The internal spring support members 34 are shaped and provided with the attaching means 36 so that the internal springs 38 in the assembly 40 can be mounted directly thereon without requiring any additional attaching structure.

The corner members 16 are of right angle shape in plan view and are of a shape in transverse section similar to the shape of the rails 12 and 14. As shown in FIG. 5, each corner member 16 has an inverted U-shape section 50 having depending portions or webs 52 and an inwardly extending flange 54 formed integral with the lower end of the innermost portion 52. The flange 54 has an opening 56 and a nut 58 is secured to the flange 54 in alignment with the opening 56. The purpose of the nut 58 is to provide attaching means on which a supporting leg 60 for the frame 10 can be mounted. It can thus be seen that by assembling the four legs 60 with the corner members 16, the frame 10 can be floor supported so that it can function as the primary support for the bed of which the box spring 10 forms a part.

When the frame 10 is to function as the primary bed support, a reinforcing bar 66 is secured to each of the rails 12 and 14 as shown in FIG. 2. Each rail 12 and 14 is formed in its top surface 20 with upwardly extending tubular projections 68, the projections 68 being spaced apart in a direction longitudinally of the rail in each case. The reinforcing bar 66 is of a generally U shape having upwardly extending legs 70 which preferably telescope within and frictionally engage the depending webs 22 and 24 on the rail 12 or 14. Each reinforcing bar 66 is of a length substantially equal to the length of the rail on which it is to be mounted and is attached to its rail 12 or 14, when reinforcing of that rail is desired, by extending self tapping screws 72 upwardly through openings 74 in the bar 66 and threading the screws 72 into the tubular projection 68 as shown in FIG. 2. The tubular projections 68 provide for a long thread engagement of the screws 72 with the rail 12 or 14 to provide for a secure mounting of the reinforcing bar 66 on the rail at a relatively low cost.

Thus, in the event it is desired that the frame assembly 10 function as the primary bed support, either at the time the frame assembly 10 is purchased or at a subsequent time, the frame assembly 10 can readily be adapted for carrying the necessary loads by attaching the reinforcing bars 66 to the side rails 12 and the end rails 14 and mounting legs 60 on the corner member 16.

As shown in FIGS. 2 and 3, the outer web 22 in each of the rails 12 and 14 is provided with an integral depending hook-shaped extension 80 which turns inwardly of the frame 10. Each corner member 16 (FIG. 5) is formed with a similar attached extension 80 on its outer depending web portion 52. The purpose of the extension 80 is to provide a means for attaching the fabric box spring cover, shown diagrammatically at 86 in FIG. 2, to the frame 10. This is accomplished by securing a cover attaching member 88, which is formed of a resilient plastic material such as polyethylene, to the peripheral edge 90 of the cover 86 as shown in FIG. 6. The attaching member 88 is preferably formed with a flange extension 92 of reduced thickness and the edge 90 of the cover 86 is secured, such as by stitching 94, to the innerside of the flange extension 92. The member 88 has a hook shape body portion 96 shaped to frictionally engage within the hook shaped extension 80, as shown in FIG. 2, and a leg 98 which is bent around and engaged with the outer side 100 of the extension 80.

At the juncture 102 of the extension 80 and the web 22, the extension 80 is offset outwardly of the frame 10. As a result, the cover 86 is spaced from the frame 10 so that contact between the frame 10 and the cover 86 is avoided to prevent any discoloration of the fabric cover 86 by rust on the frame 10. This avoids the necessity for coating the frame 10 with a costly rust inhibiter, an inexpensive conventional wax coating for the frame 10 being adequate.

As shown in FIG. 7, an end rail 14 is readily adapted to support brackets, such as the bracket shown at 130, on which a bed headboard 132 can be mounted. A plurality of brackets 130 would be used, each including a generally C-shaped mounting section 134 having vertically spaced attaching legs 136 and 138. The upper leg 136 is positioned against the rail top surface 20 and the leg 138 is positioned against the bottom side of the rail flange 26. A bolt or screw 104 is then extended through the legs 136 and 138 and the rail 14 so as to connect the bracket 130 to the rail and clamp the rail between the legs 136 and 138. The bracket 130 also includes a support section 142 which extends downwardly in a clearance relation with the rail extension 80 and then upwardly for attachment to the headboard 132. The brackets 130 can be attached to a rail 14 with or without a reinforcing bar 66 thereon.

FIGS. 8 and 9 illustrate the attachment of two frame assemblies 10, of twin bed size for example, to form a larger size frame, of king bed size for example. The two assemblies 10 are arranged side by side and brackets 150, only one of which is shown, are used to connect the adjacent corners of adjacent frames. Each bracket 150 has a generally U-shaped center section 152 and end flange sections 154. The flanges 154 are secured by screws 156 to the nuts 58 in the adjacent corner members 16 in the frame 10 so as to position the bracket center section 152 in a clearance relation with the corner members 16. A frame supporting leg 158 is then attached to the bracket

center section **152**. The resulting composite frame assembly then has six supporting legs like the leg **158**.

In FIG. 10, an extruded rail **110** is shown which can be used in place of the rails **12** and **14** previously described. The extruded rail **110** is of one piece construction corresponding substantially in cross sectional shaped to the previously described shapes of the rails **12** and **14**. The rail **110** has supporting surfaces **20** and **28** corresponding to the surfaces previously described, and in addition is provided with an inwardly facing channel section **112** disposed above the surface **20** to facilitate the attachment of main box springs, such as the one shown at **114**, to the rail **110**. The rail **110** is also formed with a plurality of downwardly extending openings **116**, only one of which is shown, into which the downwardly extending prong or end section **118** on the spring **114** can be extended. The spring **114** is readily assembled with the rail **110** by disposing a conventional torsion bar end section **120** on the spring **114** in the channel section **112** and extending the prong **118** through the opening **116**. The rail **110** can also be provided with the tubular projection **68** shown in FIG. 2 to facilitate the attachment thereto of the reinforcing bars **66**.

In use, the frame assembly **10** is fabricated as shown but without the reinforcing bars **66**. The cover **86** is attached by manually moving the body portion **96** on the attaching member **88** into the hook shape rail extension **80** as shown in FIG. 2. In the event it is desired to use the frame **10** as the principal bed support, the legs **60** are assembled with the corner member **16** as shown in FIG. 5, and the reinforcing bars **66** are attached to the rails **12** and **14** as illustrated in FIG. 2. The bars **66**, by virtue of their U-shape in cross section are of light weight but have sufficient strength in lateral bending to reinforce the frame **12** to the extent necessary to withstand the normal bed loads.

From the above description it is seen that this invention provides a box spring frame assembly **10** which is readily formed from metal or equivalent material and which has a high strength to weight ratio. By virtue of the support surfaces **20** and **28** on each frame rail, the internal frame members **30** and **34** and the box spring assembly **40** are readily mounted on the rails thus reducing box spring assembly time. The hook-shape extensions **80** provided on the rails facilitate the final assembly of the box spring cover **86** with the frame **10** without requiring any additional attaching structure. Frames of various sizes can be constructed by providing ends rails **12** and side rails **14** of the necessary lengths and two twin size frames can be secured by connecting brackets **150** (FIGS. 8 and 9) extended between the mounting nuts **58** on the corner members **16** for adjacent frames. Thus considerable versatility is achieved in the frame **10** of this invention. A retailer of box springs equipped with the frame assembly **10** of this invention can readily strengthen the box spring frame **10** by adding the reinforcing bars **66** so as to adapt the frame **10** for floor mounting rather than on the bed frame.

It will be understood that the box spring frame assembly which is herein disclosed and described is presented for purposes of explanation and illustration and is not intended to indicate limits of the invention, the scope of which is defined by the following claims.

What is claimed is:

**1.** A generally rectangular box spring frame assembly comprising a pair of substantially parallel side rails, a pair of substantially parallel end rails, corner members secured to and constituting the sole connection between the adjacent ends of adjacent side and end rails, each of said rails and each of said corner members being shaped so that it has at least one substantially upright load resisting web, each of said rails being shaped so that it also has a spring supporting surface, and internal spring support members supported on and extending between said side rails.

**2.** A box spring frame assembly according to claim **1** wherein each of said rails includes a section of a substantially inverted U-shape in cross section having a substantially horizontal portion which forms said spring supporting surface and spaced depending portions one of which constitutes said web.

**3.** A box spring frame assembly according to claim **1** further including means on said corner members for attaching supporting legs to said frame.

**4.** A box spring frame assembly according to claim **1** further including means on said rails for attaching springs thereto.

**5.** A box spring frame assembly according to claim **2** further including reinforcing bars for said rails, each of said reinforcing bars being disposed between the spaced depending portions on a rail and being secured to said rail.

**6.** A box spring frame assembly according to claim **2** wherein each of said side rails has a second supporting surface on which said internal spring support members are mounted, said second supporting surface on each side rail being formed integral with the lower end of one of said depending portions and extending inwardly of said frame.

**7.** A box spring frame assembly according to claim **6** wherein the inner one of said depending portions has an inwardly extending flange forming said second supporting surface, the outer one of said depending portion is provided with integral means for attaching a spring cover to said frame and each of said rails is of one-piece construction.

**8.** A box spring frame assembly according to claim **6** further including a brace secured to and extending between said end rails intermediate the ends thereof and having a top surface disposed substantially in alignment with said second supporting surfaces on said side rails and arranged in supporting engagement with said internal spring support members intermediate the ends thereof.

**9.** A box spring frame assembly according to claim **5** wherein the substantially horizontal portion of each of said rails is formed with spaced upwardly extending tubular projections and each of said reinforcing bars is of a substantially U-shape in cross section, and bolt means extending through said bars and threadably engaged with said projections.

**10.** A box spring frame assembly according to claim **3** further including a pair of brackets for connecting the adjacent corner members in a pair of side-by-side frame assemblies, each of said brackets including means for mounting a supporting leg thereon.

**11.** A box spring frame assembly according to claim **3** further including bracket means attached to one of said end rails for mounting a headboard thereon, said bracket means including a mounting section attached to said horizontal portion of said one end rail and a support section which extends downwardly and then upwardly from said mounting section in a clearance relation with said one end rail.

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U.S. Cl. X.R.

5—351.3; 297—218