Oct. 9, 1962 J. R. McKAY 3,056,974

BED FRAMES

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Fig. 1

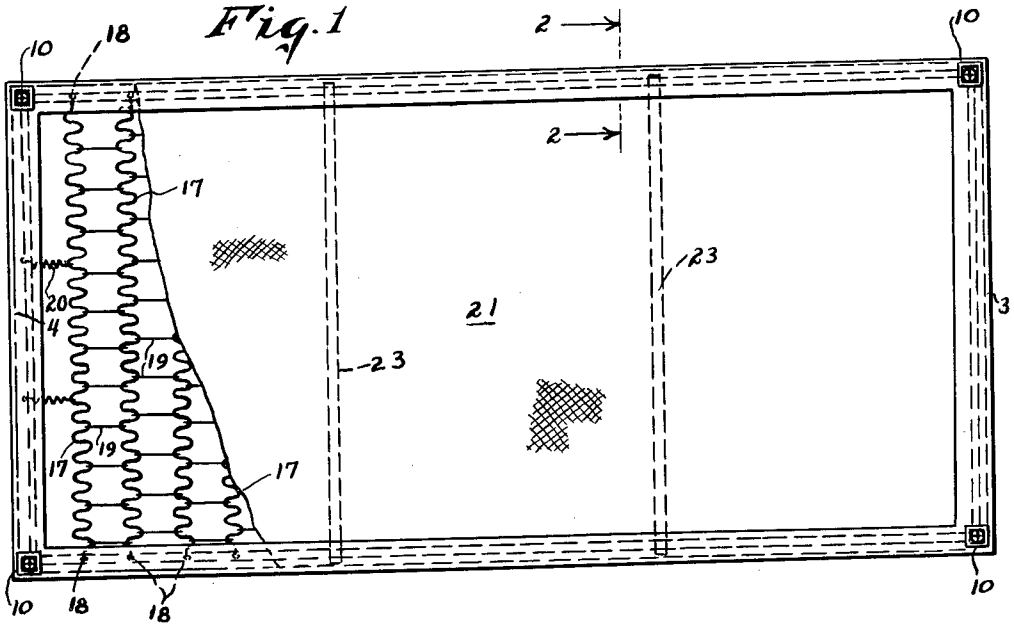


Fig. 2

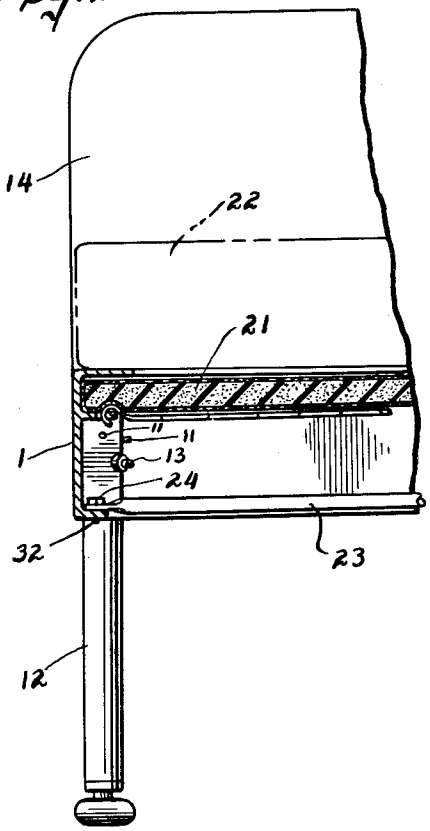
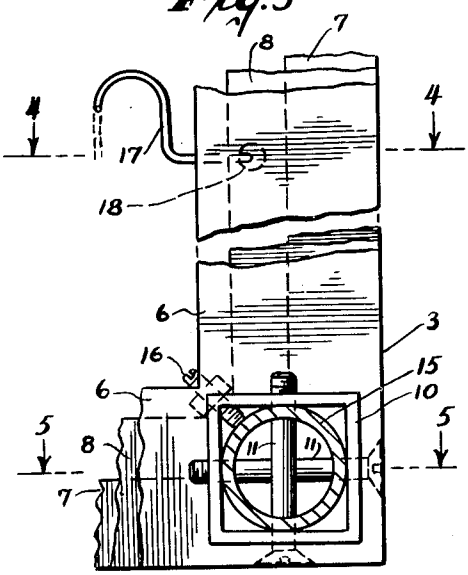


Fig. 3



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Fig. 4

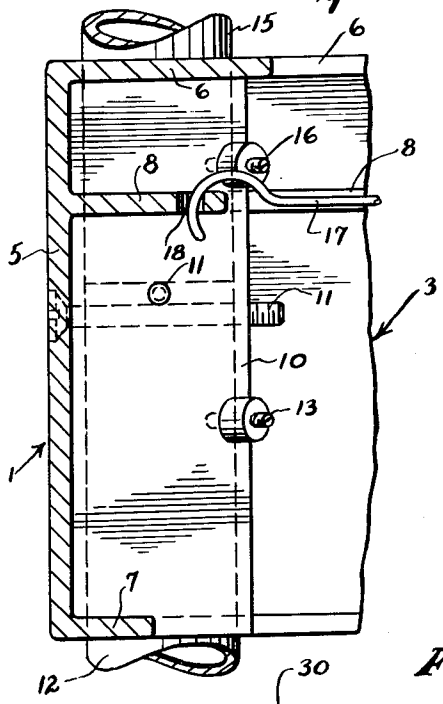


Fig. 5

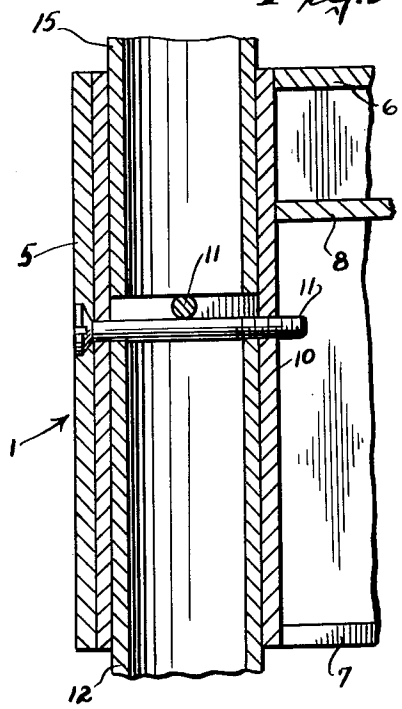
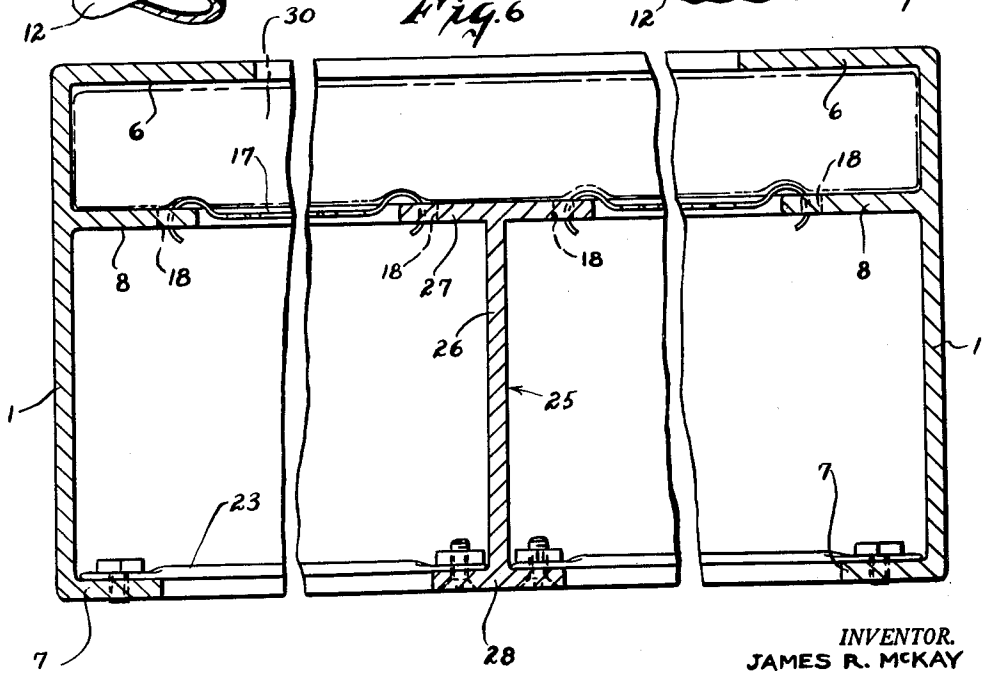


Fig. 6



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United States Patent Office

3,056,974

Patented Oct. 9, 1962

3,056,974

BED FRAMES

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Filed May 2, 1961, Ser. No. 107,238
6 Claims. (Cl. 5—247)

This invention relates to bed frames and, more particularly, relates to improved bed frame construction for use with flat spring assemblies.

This application is a continuation-in-part of Serial No. 784,581, now abandoned, filed January 2, 1959, for bed frames.

Bed frames, that is a frame adapted to receive and support conventional mattresses, have been constructed utilizing flat spring assemblies, commonly known as "zig-zag" or "no-sag" springs. The utilization of such spring assemblies have advantages over conventional box springs, primarily the advantage of providing the desired level, firm spring surface at a far lower cost than the equivalent box spring.

However, if a mattress is supported directly upon such springs, the user's hands and the bedclothes are often cut and torn by the spring ends when inserting the bedclothes between the mattress and springs as customary during making of the bed. Also, the bedclothes are often torn during use of the bed due to contact with the springs and hook ends thereof.

It has been proposed to provide a protective cover for such springs similar to the cover on box spring assemblies. However, unlike the easily deflected edges of a box spring, the flat springs must be affixed to rigid supporting structures on each side of the assembly. Thus, on deflection of the spring, the cover must stretch. Covering material having the necessary stretch characteristics as well as the desired body and wearability are not available.

Pads over the springs have not been satisfactory due to the shifting of the pad during use. Anchors to hold the pad have not been successful since this will either rip the pad or fail to provide the necessary holding force.

It is, therefore, an object of this invention to provide a novel bed frame having an improved means for supporting the springs and for housing a protective pad over the springs in such manner as to provide a flat, smooth surface upon which a mattress can be placed and, thus, protect the mattress and bedclothes from contact with the springs. Such pad also protects the fingers and hands during the bed making operation.

It is a further object of this invention to provide a novel bed frame having great strength and rigidity capable of withstanding the severe stresses imposed thereon by "zig-zag" springs.

A further object of this invention is to provide an improved corner construction of great strength and rigidity having means for receiving and securing supporting legs and head and foot boards thereon, if desired. Without such supporting legs, the bed frame may be used in the manner of an ordinary box spring.

It is a still further object of this invention to provide a novel bed frame for a double bed utilizing flat spring assemblies which frame will provide essentially level support for a mattress supportably carried by said frame.

Other objects and advantages of the invention will appear hereinafter.

A preferred embodiment of the invention selected for the purposes of illustration is shown in the accompanying drawings, in which:

FIG. 1 is a top plan view of the bed frame with the pad cut away at one end to show the spring construction;

FIG. 2 is a section on the line 2—2 of FIG. 1;

FIG. 3 is a full size top plan view of one corner of the frame;

FIG. 4 is a section on the line 4—4 of FIG. 3;

FIG. 5 is a section on the line 5—5 of FIG. 3; and

FIG. 6 is a sectional view of another embodiment of this invention.

Referring to FIGS. 1–5, and in particular to FIGS. 1 and 2, the bed frame comprises two parallel longitudinally extending side rails **1**, **2** and two parallel transversely extending end rails **3**, **4**, the ends of the side rails being joined to the ends of the end rails as herein after described to form a unified rectangular frame.

In the preferred embodiment illustrated, each of said side and end rails is substantially E-shaped in cross section, and comprises a vertical web **5**, a horizontal flange **6** extending inwardly (i.e. toward the inside of the rectangle) from the top of said web, a horizontal flange **7** extending inwardly from the bottom of said web, and a horizontal flange **8** extending inwarding from an intermediate portion of said web. Said side and end rails are preferably formed by extrusion of aluminum or aluminum alloys.

The ends of adjacent rails are joined to form corners as shown in FIGS. 3 and 4. As shown therein, the end of side rail **1** is joined to the end of end rail **3** by means of a vertically disposed hollow rectangular member **10** secured to the inside faces of the vertical webs of the adjacent rails. The said members **10** preferably are of a length equal to the height of the rails and may be secured to the rails in any suitable manner, as by bolts **11**, or by welding, or both. The flanges **6**, **7** and **8** are cut away to form recesses to accommodate the member **10**.

The rectangular members **10** are often at both ends, so that each corner of the bed frame may be supported by a leg, and as shown in FIGS. 4 and 5, the upper end of leg **12** is received within the lower end of member **10** and is secured therein by a bolt **13**. Likewise a headboard or a footboard **14** may be supported on the frame by members **15** received within the upper end of member **10** and secured therein by bolt **16**. Without such supporting legs the bed frame may be used in the manner of an ordinary box spring.

The above described corner construction forms a very strong, rigid joint, which is also simple and inexpensive to manufacture. It has the further advantage that the members **10** not only serve to join the side and end rails, but also serve as sockets for the legs **12** and for a headboard or footboard **14**.

According to the present invention, a bed spring assembly is connected to and supported by the intermediate flanges **8** of the frame members. Various types of flat spring assemblies may be used, but I prefer to use a type of spring assembly illustrated fragmentarily in FIGS. 1 and 2 and which is known in the trade as a "no sag" or "zig-zag" spring. In using such spring assemblies, the individual spring elements **17** may be anchored directly to the intermediate flanges **8** of the rails by means of apertures **18** through which the ends of the spring elements may be passed.

In the use of such springs, the individual spring elements are preferably anchored to the side rails, and such springs may be used with or without connecting links **19** and with or without extension springs **20** anchored to the end rails. It will also be understood that other types of spring assemblies may be used which may be anchored to the side rails or to the end rails or both. In the preferred embodiment of the invention, therefore, both the side rails and the end rails or of E-shaped cross section, as shown, in order that the intermediate flange may be available for anchoring the spring assembly an all four sides, if desired.

The top flange **6** of each rail is at least as long as the intermediate flange **8** and is preferably longer. Moreover, the intermediate flange **8** is substantially closer to

the top flange 6 than it is to the bottom flange 7. By such construction, there is provided a relatively shallow U-shaped channel defined by the upper and intermediate flanges 6 and 8 and the vertical web 5 therebetween which receives and houses the edges of a thin protective pad 21. The top flange 6 must be of sufficient length to prevent the edge of the pad from moving beyond the flange when the springs 17 are deflected in use. Thus, the flange will provide a housing for the pad even during deflection of the spring. When the springs return to the undeflected position, the pad edges will return into the channel. It has been found that a flange length of about 2 inches is sufficient to properly house the pad under all normal conditions of use. The pad is neither constructed nor adapted to serve as a mattress, but separates the spring from the mattress and provides a smooth, flush surface across the entire frame upon which a conventional mattress can be placed.

Thus, by this construction the bedclothes may be tucked under the mattress very easily and the protective pad isolates the bedclothes and the hands of the user from damaging engagement with the flat springs. The pad 21 may be made of any desired material, such as rubberized hair.

The bottom flange is preferably shorter than the intermediate and top flanges. The bottom flange serves the double function of stiffening the rails and supporting the flattened end portions 24 of transversely extending anti-twist rods 23. The rods are secured to the bottom flange by bolts 32 to reinforce the frame and to provide increased torsional rigidity to the rails. The bottom flange reinforces the rails. However, the "zig-zag" springs apply such high stresses to the rails that the use of the anti-twist rods are preferred.

It will be understood, therefore, that it is preferable to provide both the side rails and the end rails with both top and intermediate flanges for housing of the pad even in those applications where the spring assembly is anchored only to the side rails.

In many applications it is desired to provide a frame suitable for use as a double bed. In such applications, it is often found that excessive deflection occurs at the middle of the flat spring assembly. When it is desired to have a firm, flat double bed, the construction shown in FIG. 6 may advantageously be employed.

In FIG. 6 there is shown the side rails which are fabricated in the same manner as explained in connection with FIGS. 1–5 and to which like reference numerals have been applied. Extending between the end rails is a center rail 25 of substantially I-shaped cross section having a vertical web 26, a top flange 27 and a bottom flange 28 extending horizontally therefrom.

The center rail is affixed to the midpoint of the end rails. The spring elements 17 extend between the top flange 27 of the center rails and the intermediate flange 8 of each side rail and are anchored to the flange by means of apertures 18 through which the ends of the spring elements may be passed.

A protective pad 30 is supported by both spring assemblies and extends across the entire width of the bed into the U-shaped channels defined by the upper and intermediate flanges of the side rails which frictionally hold the protective pad in place and to provide a flat top surface across the entire bed upon which a conventional mattress may be placed. With such construction, the mattress may be made up in conventional manner without danger of contacting the ends of the spring assemblies by either bedclothes or the hands.

In addition to providing a firm, flat mattress support, it will be obvious that the rigidity of each half of the bed may be varied to suit the user by utilizing spring assemblies of differing rigidity on each side of the center rail.

In the double bed construction, reinforcing rods extend between the bottom flange 28 of the center rail and the bottom flange 7 of each side rail. The bottom flanges 7 are adapted to receive and support the anti-twist rods which are affixed thereto to provide a rigid frame, reinforcing the strength of the rails against twisting.

This invention may be variously modified and embodied within the scope of the subjoined claims.

What is claimed is:

1. A bed frame comprising a pair of parallel longitudinally extending side rails, a pair of parallel transversely extending end rails, said rails being joined at their ends to form a rectangular frame, at least two of said frame members being substantially E-shaped in cross section and comprising a vertical web, a horizontal flange extending inwardly from the top of said web, a horizontal flange extending inwardly from the bottom of said web, and a horizontal flange extending inwardly from an intermediate portion of said web and spaced from said top and bottom flange, an end of each of said rails being joined to an end of each adjacent rail by a vertically disposed hollow rectangular member open at the top and bottom and secured to the inside faces of the vertical webs of adjacent rails, and a spring assembly connected to and supported by said intermediate flanges, and lying in a plane below the plane of said top flanges.

2. A bed frame as claimed in claim 1 in which each corner is supported by a leg, the upper end of which is received within and secured to said hollow rectangular member.

3. A bed frame as claimed in claim 1 including a pad supported by said spring, said pad being of a thickness substantially equal to the distance between the plane of said spring and the plane of said top flanges.

4. A bed frame comprising a pair of parallel longitudinally extending side rails, a pair of parallel longitudinally extending end rails, said rails being joined at their ends to form a rectangular frame, at least two of said frame members being substantially E-shaped in cross section and comprising a vertical web, a horizontal flange extending inwardly from the top of said web, a horizontal flange extending inwardly from the bottom of said web, and a horizontal flange extending inwardly from an intermediate portion of said web and spaced from said top and bottom flanges, a spring assembly connected to and supported by said intermediate flanges, said top flange being at least as long as said intermediate flange and said intermediate flange being substantially closer to said top flange than it is to said bottom flange to define a shallow U-shaped channel, a thin protective pad supported by said spring, the edges of said thin protective pad being housed within said channel to provide a substantially flat surface upon which a mattress can be placed.

5. A bed frame according to claim 4 which includes reinforcing bars extending across said frame and secured to and supported by said bottom flanges.

6. A bed frame according to claim 4 which includes a center rail extending between the end rails and parallel with said side rails, said center rail being substantially I-shaped in cross section and comprising a vertical web, a top horizontal flange, and a bottom horizontal flange, and in which said frame includes a spring assembly connected between the intermediate flange on each side rail and the top flange on said center rail.

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