Jan. 12, 1971 F. SPROLL 3,553,745

BED FRAME ASSEMBLY

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FIG. 1

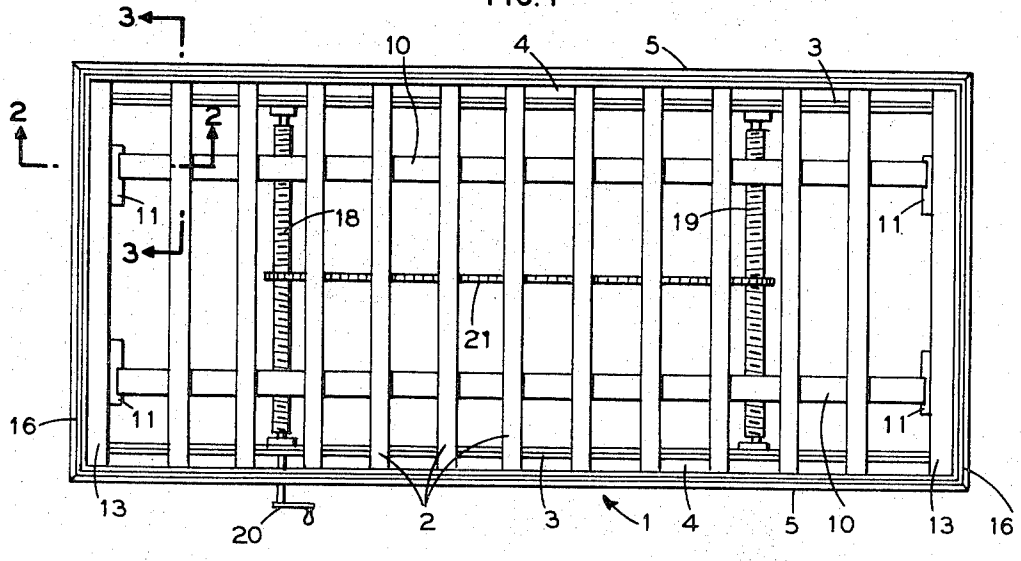


FIG. 2

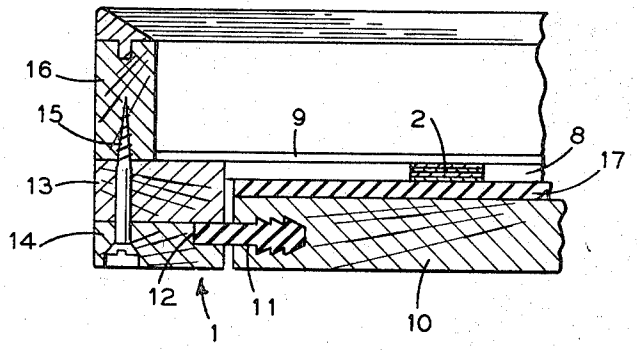
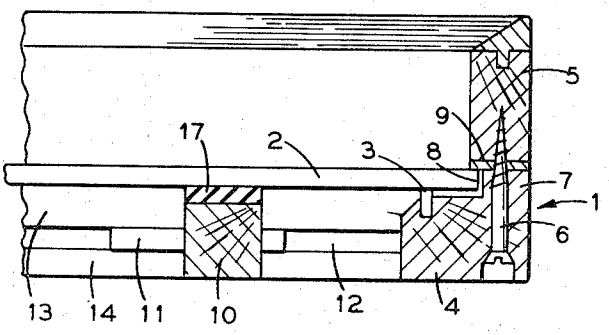


FIG. 3



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BED FRAME ASSEMBLY

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FIG. 5

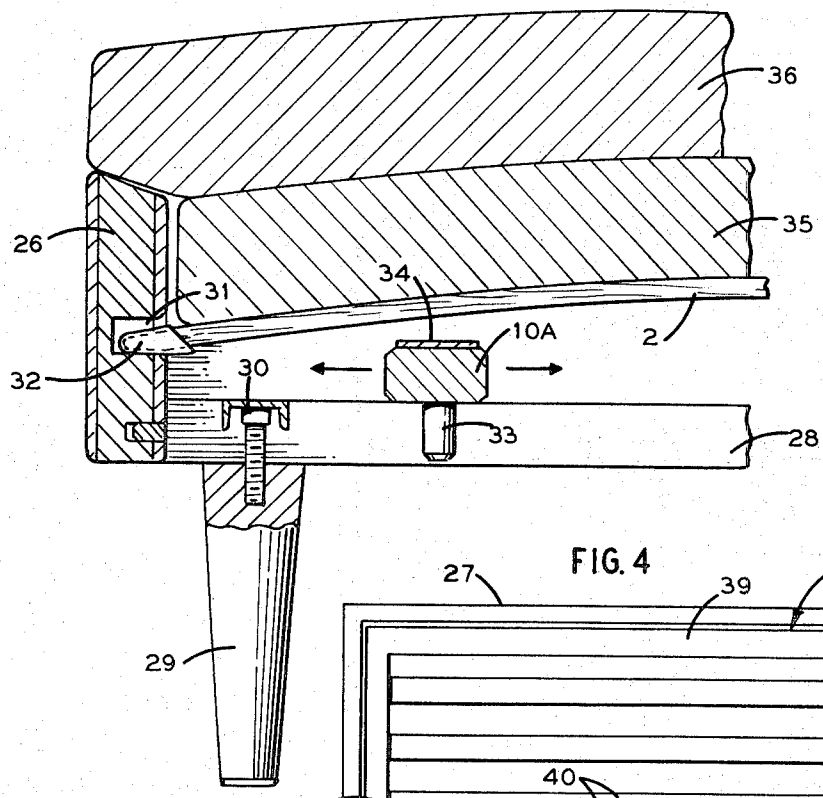


FIG. 4

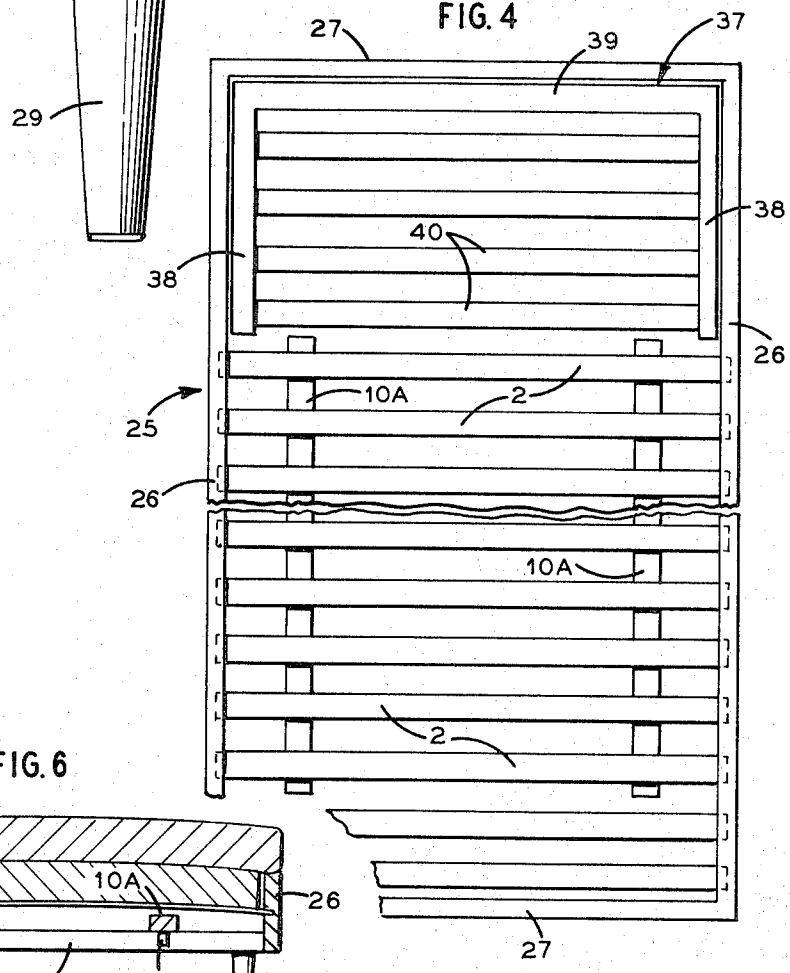
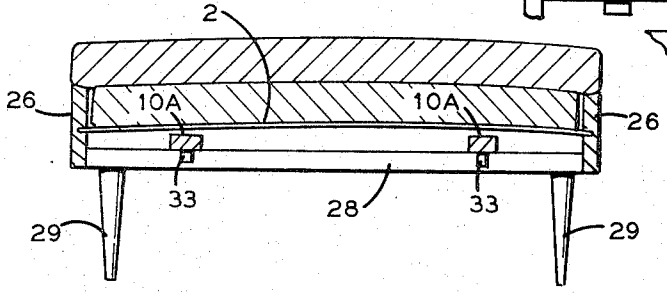


FIG. 6



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BED FRAME ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

A bed frame assembly having mattress supporting slats, with means for adjusting the firmness of the slats.

BED FRAME ASSEMBLY

Conventional bed frame assemblies have the disadvantage that their resiliency cannot be adjusted to individual preferences. Such preferences vary greatly. While some people like a very soft bed, others prefer a comparatively firm support. Frequently, a bed which provides a firm support to the body is a necessity for reasons of health; for example, for people suffering from osteochondrosis intervertebralis, nowadays a very common form of joint disorder. The conventional bed frame assemblies afforded no possibility of adjustment to specific needs.

Accordingly, it is an object of the present invention to remedy this situation by providing an improved bed frame assembly which may be easily adjusted to the most varied requirements as regards its resiliency. According to the present invention this objective is accomplished by providing the frame with adjustable support members which support slat support elements from below at a variable distance from the frame. It is obvious that the resiliency of the slat support elements will remain essentially unaffected as long as said adjustable support members are positioned in close proximity to the sides of the frame so that the bed frame assembly and, consequently, the bed as such provide a soft support to the body, whereas the resiliency of the slat support elements will be progressively reduced, resulting in a progressively firmer support of the frame assembly and the bed as the distance between the adjustable support members and the sides of the frame is increased so that the slat support elements have their deflection characteristics varied.

In one case said support elements take the form of shiftable members, the ends of which are engaged by opposite side rails of the frame. Said members can be shifted with ease, by hand or by suitable means, in parallel relation to each other and are thus displaced from the rails of the frame to a greater or lesser extent, thus providing the desired support of the slat elements. A preferred embodiment of the invention provides for two members extending in the longitudinal direction of the frame and being adjustable in symmetrical relation to the longitudinal center line of the frame. The members themselves may have a limited amount of inherent resiliency so that the resiliency of the bed frame assembly will not be eliminated completely when the two members approach the center of said bed frame assembly.

To assist the shifting motion, the ends of the beams may be provided with tongues engaged by corresponding grooves in the rails of the frame. A particularly favorable construction is one in which the tongues are formed by strips of a material with good sliding properties such as vulcanized fiber or plastic, said strips being set into the end faces of the members and preferably projecting from the members. The projecting portions of the strips may be used to limit the closest approach of the members and also to prevent the members from shifting angularly. If the bed frame assembly according to the invention is used in private homes where the bed will normally be used by the same person over long periods

of time so that there is no need of changing the adjusted firmness of support, it will be sufficient if the support elements may be individually adjusted by hand such that the members, for example, may be moved by hand into the desired position. On the other hand, if the bed is continually used by different persons, as, for instance, in a hotel, it is desirable that the support members be adjusted in a quick and simple manner.

The present invention is particularly well adapted to bed frame assemblies in which the supporting elements are formed by slats extended across the frame. Such slats are highly resilient and provide a relatively soft support which may, however, be adjusted to a desired firmness by means of longitudinally disposed adjustable members.

Further details and embodiments of the invention will become apparent from the following specification, in which the invention is described and explained more fully with reference to the embodiment shown by way of example in the accompanying drawing. In other embodiments of the invention, the features which are apparent from the specification and the drawing may be applied individually or in any desired combination. In the following description, reference will be made to the accompanying drawing, in which

FIG. 1 is a top plan view of a bed frame assembly embodying the invention;

FIG. 2 is a sectional view on the line 2—2 through an end portion of the bed frame assembly according to FIG. 1 drawn on an enlarged scale;

FIG. 3 is a sectional view on the line 3—3 through a lateral portion of said bed frame assembly drawn on the same scale as FIG. 2;

FIG. 4 is a top plan view showing of another embodiment of the invention;

FIG. 5 is a partial transverse view, with part in section, showing some details of the slat-support member assembly; and

FIG. 6 is an end view thereof.

As shown in FIGS. 1–3, the bed frame assembly consists of a rectangular frame **1** spanned by narrow wooden slats **2**, which may be of laminated construction, said wooden slats forming the resilient support elements for a mattress, upholstered cover or the like. At their ends slats **2** rest on the rounded top edge of a strip **3** set into the top of the longitudinal side rails **4** of the frame **1**, said strip consisting of vulcanized fiber. In addition, the ends of slats **2** engage the underside of a frame portion **5** which with the aid of screws **6** is fastened on a raised edge portion **7** of side rail **4** thus providing a recess **8** for receiving the ends of said slats **2**. The underside of said frame portion **5** is faced with a hard-rubber layer **9** enabling a certain amount of preloading to be kept applied to the ends of slats **2** between strips **3** and the underside of frame portion **5**.

In order to vary the possible deflection of the slats **2**, the bed frame assembly shown in the drawing is provided with two longitudinal members **10** which may be shifted to positions in parallel relation to the side rails **4** of the frame **1**. For this purpose, the ends of said longitudinal members **10** are provided with inset strips **11** projecting from the end faces of said longitudinal beams **10** in the form of tongues which are received in recesses **12** of the cross rails **14** of the frame **1**. Said strips **11**, which may also consist of vulcanized fiber, project beyond either side of the longitudinal member **10** thus providing a relatively long sliding surface which prevents the longitudinal member **10** from taking angled positions during shifting. In the embodiment of the invention shown by way of example said recess **12** is formed by a rabbet formed in the lower cross rail member **14**, the dimensions of which determine the size of said groove **12**. The cross rail mem-

bers **13**, **14** are joined by screws **15** which also serve to fasten on the cross rails a frame portion **16** having a cross-section which is similar to that of the frame portion **5**. The frame portions **5** and **16**, which rise above the plane of support formed by the slats **2**, serve to retain a mattress or the like placed on said slats **2**, preventing it from slipping down. In order to minimize friction while the longitudinal members **10** are being shifted, the surfaces of said members are faced with an antifriction coating **17** such as hard rubber, for example.

It will be apparent that the resiliency of the bed frame assembly provided by the slats **2** will remain essentially unaffected as long as the longitudinal members **10** are positioned in close proximity to the side rails **4** of the frame **1**. As said longitudinal members **10** approach the central longitudinal plane of the bed frame assembly, the slats **2** will be capable of reduced deflection and the support which the bed frame assembly provides to the body will become firmer. It is, therefore, possible to adjust the bed frame assembly to the desired degree of firmness by shifting the longitudinal members **10** toward and away from each other.

If this adjustment is to be effected only once at the time the bed is first put to use, the slight inconvenience of individually moving the longitudinal members **10** by hand to the required position will be readily accepted. Once the bed frame assembly has been adjusted to the desired firmness there will be no further need of changing the position of the longitudinal members **10** as long as the bed is used by the same person and the needs of that person do not change. On the other hand, if the user of the bed changes almost daily as, for example, in a hotel, the position of the longitudinal members **10** cannot be readily adjusted by hand, because in that case the bedding would have to be removed for each and every adjustment. In such a case it is advisable to provide the bed frame assembly with an adjusting device for the beams disposed in such a manner that it may be operated from the outside thus obviating the need of removing the bedding.

As shown in FIG. 1, this is achieved by means of two threaded spindles **18** and **19** disposed in spaced parallel relation to the slats **2** and thus perpendicular to the longitudinal members **10**. The spindles **18**, **19** extend through the longitudinal members **10** which are provided with corresponding nuts. One half each of said spindles **18** and **19** is provided with a right-hand screw thread while the other half is provided with a left-hand screw thread such that the longitudinal beams are moved toward and away from each other by rotating the spindles. The spindle **18** extends through one of the long rails **4** of the frame **1** and is provided with a head crank **20** at its outer end. The other spindle **19** is driven from the spindle **18** through a sprocket chain **21** running over sprocket wheels disposed on said spindles **18** and **19**. It is, therefore, possible to move the longitudinal members **10** in parallel relationship towards and away from each other by turning the crank and thus adjust the firmness of the support which the bed frame assembly provides to the body. The extreme outer and inner positions of the members **10** are limited by contact between the strips **11**, which project from the members **10**, with the side rails **4** of the frame or with each other respectively.

In another embodiment of the invention, shown in FIGS. 4–6, slats **2** may have their firmness adjusted by longitudinal members **10A** which are manually shifted toward and away from each other to provide the desired stiffness in supporting slats **2**.

To this end a rectangular frame assembly **25** is made up of longitudinal side members **26** interconnected by end transverse members **27**. Longitudinal members **26** are further interconnected by intermediate transverse members **28** from which depend legs **29** secured thereto by screws **30**.

The side members **26** are formed with a longitudinal groove **31** on the inner sides thereof. The slats **2** are tipped at their opposite ends with plastic cups **32**. The slats **2** may be suitably bowed to allow their end portions to be snapped into grooves **31**.

The longitudinal members **10A**, similar to members **10**, shown in FIGS. 1, 3, are provided with depending guide pins **33** which are adapted to slidably abut side edges of frame members **28**, to retain the members **10A** against longitudinal movement during the lateral movement thereof as indicated by the arrows in FIG. 5.

The members **10A** carry on their top surfaces felt strips **34** which insulate members **10A** from slats **2** during any contact therebetween, to eliminate squeaking sounds and the like.

A foam pad **35** is located within frame **25** and a mattress **36** is disposed on pad **35**. A pillow receiving frame assembly **37** may be pivotally mounted between frame members **26** at one end thereof, by pivot means not shown. Said assembly **37** comprises a pair of side members **38** interconnected by a cross member **39**; with parallel slats **40** extending between side members **38** and fixed thereto.

It will be apparent that members **10A** may be manually positioned relative to each other and to side members **26**, to provide the desired stiffness in slats **2**.

It shall be understood that the present invention is not limited to the embodiment shown by way of example and that deviations therefrom are possible without exceeding the scope of the invention. In particular, the invention may be applied not only to bed frame assemblies in which the supporting elements for a mattress or the like are formed by cross slats but also to spring frames spanned by an elastic wire netting, spring arrangements or the like, to give but a few examples. In bed frame assemblies in which the resilient elements do not span the frame in a transverse direction, cross beams or swivel-mounted support members for the resilient support elements, for example, may be substituted for the longitudinal members. Furthermore, the adjusting device for the support members may take numerous different forms such as lever and pantograph arrangements, rope drives and the like. Finally the invention may also be applied to bed frame assemblies with an adjustable head portion, in which case the support members and, consequently, the elastic support elements, too, will be disposed in the non-adjustable portion of the frame assembly only.

I claim:

1. A bed frame assembly comprising side members and end members interconnecting said side members, slat members extending between said side members, and at least one elongated member extending parallel to said side members, means for mounting said elongated member for lateral movement to positions adjacent and remote from said side members, said elongated member being located in a plane below the slat members for engaging and limiting the flexure of said slat members, wherein a pair of said elongated members are arranged for lateral movement towards and away from each other and means for simultaneously moving said elongated members to positions symmetrically related to the longitudinal center line of said frame assembly.

2. An assembly as in claim **1** where the elongated member carries a resilient layer on a surface thereof for sliding contact with said slat members.

3. An assembly as in claim **1** wherein said member moving means comprises a pair of parallel threaded spindles mounted on said side members and in threaded engagement with said pair of elongated members, and means for simultaneously rotating said spindles to move said elongated members toward and away from each other.

4. A bed frame as in claim **1** wherein said frame includes a pair of parallel transverse members extending between said side members, leg means depending from said transverse members, said elongated member being slid-

ably movable on said transverse members, and means depending from the opposite ends of said elongated member for abutting and sliding relation to said transverse members for retaining said elongated member in longitudinal position relative to said transverse members during lateral movement thereof.

5. A bed frame assembly comprising side members and end members interconnecting said side members, slat members extending between said side members, and at least one elongated member extending parallel to said side members, means for mounting said elongated member for lateral movement to positions adjacent and remote from said side members, said elongated member being located in a plane below the slat members for engaging and limiting the flexure of said slat members, wherein said elongated member has the opposite ends thereof slidably mounted on said frame end members and said frame end members are formed with grooves, said elongated member including elongated slide means at the

opposite ends thereof, said slide means being received in the grooves of said end members to prevent angular displacement of said elongated member during movement thereof.

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