United States Patent

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Continuation-in-part of application Ser. No. 820,441, Apr. 4, 1969, now abandoned.

[54] **ADJUSTABLE BED RAIL UNIT**
10 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **5/331,** 5/100
[51] **Int. Cl.** **A47c 21/08**
[50] **Field of Search** 5/331, 100

[56] **References Cited**
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3,002,000	10/1931	Murcott	5/331
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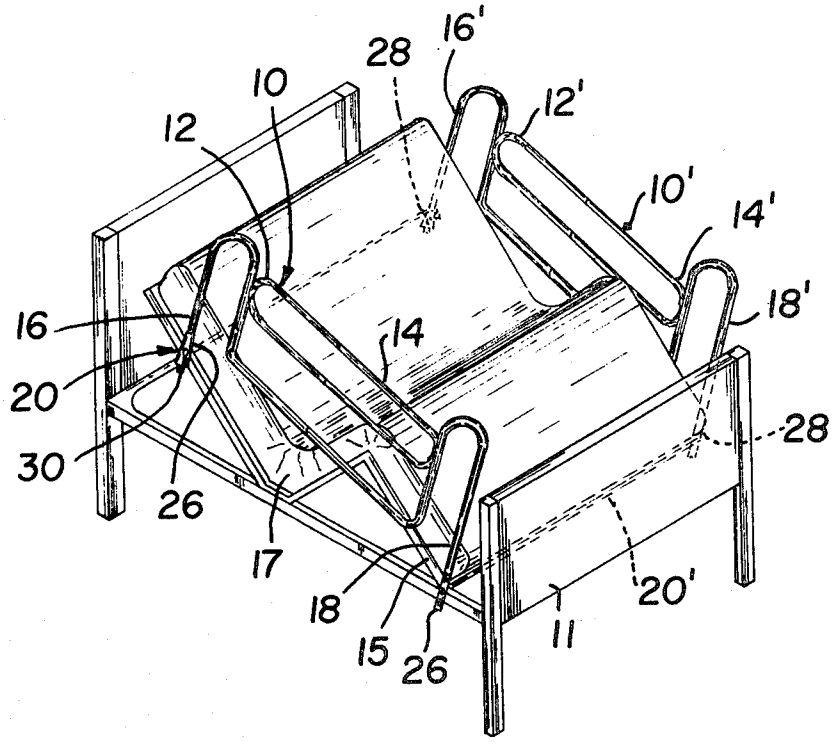
ABSTRACT: A guardrail unit for hospital beds or the like including an adjustable spring-loaded frame assembly for mounting on differently sized bed frames. The frame assembly includes a guide and clamping device for quick assembly and release from the bed. The frame assembly has two telescoped axially movable tubular members arranged so that they must first be rotated angularly with respect to each other in order to slide them inwardly of each other.



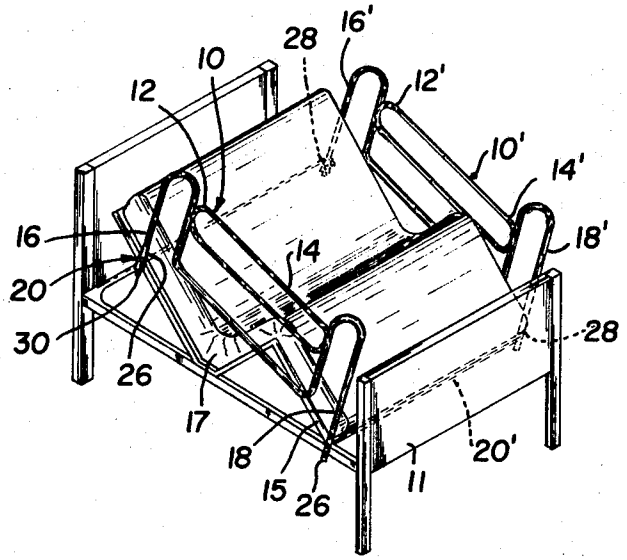


FIG. 1

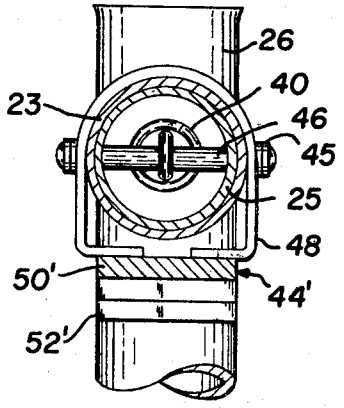


FIG. 5

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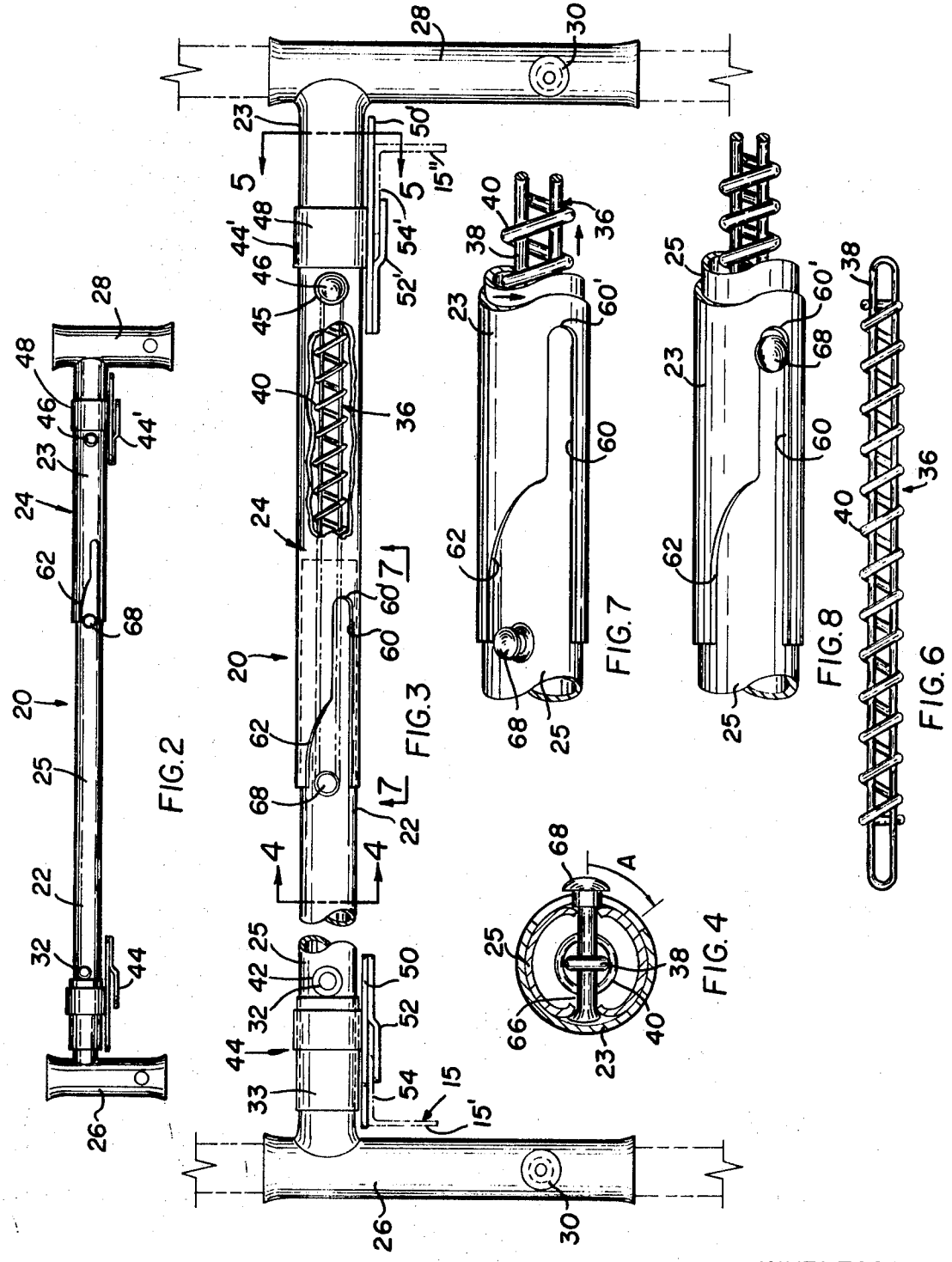

FIG. 2

FIG. 3

FIG. 4

FIG. 7

FIG. 8

FIG. 6

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ADJUSTABLE BED RAIL UNIT

This application is a continuation-in-part of our copending U.S. Pat. application Ser. No. 820,441, filed Apr. 4, 1969, entitled "Adjustable Bed Rail Unit."

This invention relates to guardrails for use in connection with hospital or other beds for retaining an occupant of the bed against accidental displacement. More particularly, the present invention relates to guardrails of the character described including a telescoping frame construction adapted to secure the guardrails and frame to the mattress support frame of a bed in an adjustable and readily releasable manner.

Adjustable guardrails and frames for securing the rails to hospital beds or the like are widely known and used in hospitals, nursing and private homes. For example, in U.S. Pat. No. 3,089,152, the guardrail and frame units consist of a pair of telescoping guardrails which are adapted to be adjustably positioned along the edges of the bed. The guardrails are connected or fastened to crossheads which form part of telescoping frame structural members adapted to secure the guardrails to the bed or mattress supporting frame. The telescoping frame structural members are longitudinally adjustable through the use of a plurality of spaced apertures in one of the members, which are selectively engaged by a spring-actuated button or pin located in the other telescoping member. The telescoping members incorporate suitable clamping devices in order to secure the guardrail and frame unit to the bed or mattress support frame.

Although the aforementioned guardrail constructions have been proven to be generally satisfactory, they are subject to limitations and disadvantages, which to a considerable extent, affect their use in their intended field of application. Thus, for example, the prior art guardrail units are generally difficult to adjust when mounted on different width or size bed frames. That is, the guardrail units of the type described in U.S. Pat. No. 3,089,152 do not readily clamp onto the bed or mattress supporting frames without extensive manipulation of the guardrail frames, and in addition, require cumbersome fastener devices to retain them in mounted position on the bed frames. In essence, the presently used guardrail units are relatively difficult to adjust, mount and dismount from variously dimensioned bed frames without extensive movement or manipulation.

In the above-mentioned patent application is disclosed a new guardrail unit which obviates the disadvantages and drawbacks encountered in the prior art by providing a guardrail and telescoping frame assembly adapted to be installed on and secured in a simple manner to a bed frame or mattress support frame. Essentially, that invention contemplates the use of telescoping tubular frame members which incorporate a tension spring adapted to exert a continuous longitudinal expansive force on the frame members. The telescoping members also include guide plates and clamping plates adjacent to their spaced ends which, under the urging of the tension spring, will readily clamp and secure the frame and guardrail unit onto a bed- or mattress-supporting frame by means of a simple manipulation, and without the need for extensive adjustment of the frame. The frame also includes a pin arrangement for mounting the tension spring, whereby one of the guide plates, during dismounting of the frame members from a bed, is adapted to contact one of the pins so as to exert a compressive force on the spring and on the frame members. Another feature of that invention lies in that the telescoping frame members, and the guard rail supporting crossheads at their ends, are rotatable relative to one another so as to facilitate adjustment of the guardrail installation.

In the telescoping frame assembly above-mentioned, it has been noted that sometimes the telescoped members will become disengaged from the bed frame with which they are engaged due to inadvertent inward movement of the telescoped members against tension in the spring while a guard rail is mounted on the frame assembly. The present invention is intended to obviate this difficulty by providing a slot with a camming edge in the outer one of the tubular members and a guide pin projecting radially from the inner one of the tubular members in such a way that the tubular members cannot be fully telescoped inwardly of each other unless the bed rails which they support are first removed, and then tubular members are turned angularly with respect to each other about 30°. By this arrangement, the frame assembly cannot accidentally be compressed and disengaged from the bed frame. Another improvement in the present frame assembly is in the use of just two telescoped tubular members with a bushing on the smaller one of the tubular members instead of three tubular members employed in the frame assembly previously disclosed.

Accordingly, it is a primary object of the present invention to provide an improved bed guardrail and frame assembly having an adjustable frame including a pair of telescoped tubular members arranged so that they must be turned angularly with respect to each other in order to remove them from a bed frame, with crossheads so arranged that the bed rails they support must be removed before the tubular members can be turned with respect to each other.

Another object is to provide a guardrail unit having just two telescoped larger and smaller tubular members with a bushing on the smaller tubular member for properly aligning clamp brackets adapted to engage on rails of a bed frame.

These and other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, in which:

FIG. 1 is a diagrammatic perspective view of a hospital bed, illustrating the mounting of a guardrail unit according to the present invention;

FIG. 2 is a side elevational view of the guardrail frame according to the present invention;

FIG. 3 is an enlarged detail view similar to FIG. 2, but with parts broken away showing the connections of the frame members with guardrails and the clamping engagement with a bed mattress-supporting frame;

FIG. 4 is a further enlarged cross-sectional view taken on line 4—4 of FIG. 3.

FIG. 5 is an enlarged cross-sectional view taken on line 5—5 of FIG. 3.

FIG. 6 is a side view of the tension spring and loop of the frame.

FIG. 7 is a further enlarged side view of a portion of the frame taken on line 7—7 of FIG. 4, to show the camming slot and guide pin more fully, the tubular members being in fully extended position.

FIG. 8 is a view similar to FIG. 7, showing the tubular members in more fully telescoped position with the guide pin engaged in the camming slot.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is illustrated a bed guardrail assembly, shown mounted on a hospital bed 11, having a folding bed frame 15, supporting mattress 17. The bed guardrail assembly, which includes a pair of side rails 10, 10'. Each rail has a telescoping small diameter end 12, 12' and a large diameter end 14, 14' which are formed, respectively into depending apertured posts 16,16' and 18, 18'.

The rails 10, 10' are adapted to be supported by a pair of frames 20, 20'. The frames 20, 20' each comprise, as shown in FIGS. 2 and 3 of the drawings, frame members 22 and 24 which have at their ends tubular crossheads 26 and 28 respectively, which are normally axially parallel and coplanar. Adjustably positioned within the crossheads 26 and 28 are the parallel apertured posts 16, 16' and 18, 18' of the guardrail. All of the crossheads may have the usual standard pullout spring-pin key members 30 adapted to selectively engage the longitudinally spaced apertures in the posts 16, 18 and 16', 18'. The frames 20, 20' may be substantially identical except

that the crossheads of one frame may be dimensioned smaller to receive snugly the smaller diameter posts **16**, and the other frame crossheads will be dimensioned larger to snugly receive the larger diameter posts **18**, **18'**.

One frame member **24** is comprised of a tubular member **23** carrying a radially outward extending pin **46** which also acts as a stop in a manner to be hereinafter more fully described. The tubular member **23** telescopes over tubular member **25** of frame member **22**. Tubular member **25** is longer in length but smaller in diameter than member **23**. A pin **32** extends diametrally through member **25** and extends outwardly of member **25** at both sides. Pin **32** is spaced from crosshead **26**. A bushing **33** surrounds member **22** and is disposed between pin **32** and crosshead. The diameter of the bushing is the same as the diameter of tubular member **23**. Pin **46** also extends diametrally through member **23** and is spaced from crosshead **28**. Pin **46** extends axially outward of member **23** at both sides; see FIG. **5**.

A tension spring assembly **36** extends longitudinally through the members **22**, **23** between pin **46** and another diametral pin **66** in member **25**; see FIG. **4**. The tension spring assembly **36**, as illustrated in FIG. **6**, includes an elongate closed loop **38** having one end looped about pin **66** and the other end looped about pin **46**. This in effect, will limit the axial expansion of the frames **20**, **20'** to the extent defined by the maximum distance between pins **32**, **46** in the loop **38**. A coiled tension spring **40** is positioned about loop **38** for substantially its full longitudinal length so as to exert a continuous separating force on pins **32**, **46** and thereby maintain the frames **20**, **20'** in their widest extended position.

The pin **32** in frame member **22** extends radially outwardly of the frame member so as to form a stop or limiting contact **42** for a guide assembly **44** mounted on bushing **33** between pin **32** and crosshead **26**. Pin **46** on member **23** has a stop **45** for guide assembly **44'** disposed between **46** and crosshead **28**.

As shown, each of the guide assemblies **44** or **44'** includes a U-shaped clamp or bracket **48** adapted to loosely slide on the member (**33** or **23**) between the pin and crosshead. A flat guide plate **50** is welded or suitably fastened, to the leg portions of bracket **48**. A bent clamp-plate **52** is fastened to the plate **50** so as to form essentially a wedge-shaped clevis or clamping fixture between plates **50** and **52**.

An axially extending slot **60** is formed in the inner end portion of tubular member **23**. This slot has a widened end portion formed with a curved camming edge **62** extending obliquely from the straight portion of the slot at the inner end of member **23**. The pin **66** is fixed diametrally in tubular member **25** and is located normally at the inner end of slot **60** of tubular member **23** to limit relative rotation movement of members **23**, **25** to the width of the end of the slot; see FIGS. **2**, **3** and **7**. Pin **66** has a head **68** which extends radially outward of member **25** and is normally disposed in alignment with an intermediate point on the camming edge **62**. The pin is so located that relative inward axial movement of the two telescopic members **23**, **25** will be stopped when head **68** reaches edge **62** if the crossheads **26** and **28** are held in coplanar parallel alignment by bed guardrails **10**, **10'**. However, if the crossheads are free to turn angularly with respect to each other, the telescopic members **23**, **25** will turn angularly with respect to each other through an angle A (FIG. **4**) as they are forced inwardly, so that head **68** is caused to slide along the narrow portion of slot **60** up to its blind end **60'** as shown in FIG. **8**. This is the inner limit of compression of the frame assembly **20** and **20'** shown in FIG. **1**.

When it is desired to position frame **20** or **20'** on a typical bed **11** as shown in FIG. **1**, the guide assembly **44** may first be installed on the mattress-supporting frame **15**. The flange **54** of frame rail **15'** will be wedged between plates **50** and **52** of guide assembly **44**. The frame **20** or **20'** will then be longitudinally compressed while the members **23**, **25** turn angularly with respect to each other through angle A, until flange **54'** of bed frame rail **15''** can be wedged between plates **50'**, **52'** of the guide assembly **44'**. At this time the lower surface of guide plate **50**, **50'**, of each of the guide assemblies **44**, **44'** is permitted to rest upon the bed frame **15**. As the compressive pressure on telescoping members **23**, **25** is released, the force of tension spring **40** will cause the frame members **22**, **24** to expand relative to each other and restore crossheads **26**, **28** to coplanar position. The pins **32**, **46** will now contact the brackets **48** on guide assemblies **44**, **44'** and push them apart as the frame members **22**, **24** expand. This in effect will cause the bed frame **54** on each side of the bed to be firmly clamped between guide plate **50** and clamp plate **52**, since the spring **40** will maintain a continuous expanding force on the guide assemblies **44**, **44'**. From the foregoing, it becomes evident that the frame **20**, **20'** and the guiderails may be assembled on a bed frame and locked thereto by means of a simple sliding motion.

In order to readjust or dismount the frame **20**, **20'** from the bed frame **15**, it is only necessary to impart a force to the crossheads **26**, **28** in opposition to the force of tension spring **40**. This will cause the frame members **22**, **24** to telescope. The crosshead will then contact the end of guide plate **50** (which is prevented from moving longitudinally by the bracket **48** contacting the respective stop pin **32** or **46**) and slide the latter off the bed frame **54**, thereby dismounting the frame from the bed.

It will be understood that if someone should lean on the bed rails **10** or **10'** to tend to compress frame **20** or **20'** the frame will not accidentally become disengaged from the bed rails **15'**, **15''**. This is because the frames **20** and **20'** cannot be compressed sufficiently to disengage guide assemblies **44** and **44'** from the bed rails unless the crossheads **26**, **28** are free to turn; and this cannot happen unless the bed rails **10**, **10'** are removed from the crossheads. Once the rails are removed the crossheads and tubular members **22**, **24** are free to turn relative to each other. This rotation is possible because the frame members are interconnected only by the flexible loop **38**. Thus the present invention has a build-in safety feature which is highly desirable.

Many modifications may be devised by those skilled in the art in order to meet different user requirements. Thus, for example, the tension loop assembly may be made shorter in length than the preferred embodiment hereinabove described such that one end is looped about pin **46** and the other end looped about a pin (not shown) which would be located closer to crosshead **28** than the pin **66**.

The foregoing disclosure relates to only a preferred embodiment of the invention and is intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of disclosure, which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. A frame member for an adjustable bed guardrail apparatus of the type having depending posts at opposite ends and adapted to be mounted on a frame of a bed having a pair of side rails, comprising in combination:

a pair of tubular members axially telescoped into each other and turnable circumferentially with respect to each other;

cylindrical crossheads secured at outer ends of the tubular members respectively for receiving respective depending parallel posts of a guardrail, said crossheads being normally disposed in axially parallel and coplanar position;

connecting means coupled between the tubular members and adapted to exert an axially expansive force therebetween;

guide-clamping means moveably mounted on each end of the tubular members adjacent one of the crossheads and responsive to said axially expansive force to engage the side rails of the bed frame;

guide-clamping stop means positioned on each tubular member to provide a stop for axial movement of said guide-clamping means;

and safety means for preventing axial movement of one tubular member into the other tubular member while the tubular crossheads are axially parallel and coplanar with

each other and for permitting such inward axial movement only when the tubular members are rotated with respect to each other to dispose the crossheads out of their normal axially parallel coplanar position, whereby the guide-clamping means can be disengaged from the side rails of the bed frame only when the posts of the guardrail are removed from the crossheads to permit relative rotation of the tubular members.

2. A frame member as defined in claim 1, wherein said safety means comprises a pin extending radially outward of one of the tubular members, and a slot extending axially outward toward one crosshead from an inner end of the other tubular member, said slot having a straight portion and a circumferentially offset end portion which is normally aligned with said pin to stop axially inward movement of the tubular members, whereby the pin can slide in the straight portion of the slot only when the crossheads and tubular members are turned angular with respect to each other to align the pin with the straight portion of the slot.

3. A frame member as defined in claim 2, wherein said offset portion of the slot has an oblique camming portion to guide the pin into the straight portion of the slot while the crossheads and tubular members are rotated with respect to each other.

4. A frame member as defined in claim 3, wherein said pin is normally disposed in said slot at the inner end of said other tubular member to limit circumferential rotation of the tubular members with respect to each other to an angle determined by the width of said offset end portion of the slot.

5. A frame member as defined in claim 1, wherein one of the tubular members is smaller in diameter than the other tubular member, and further comprising a bushing on said one tubular member adjacent the crosshead thereon and supporting the guide-clamping means thereon, said bushing having a diameter equal to that of the other tubular member so that the guide-clamping means are disposed in axial alignment on both tubular members.

6. A frame member as defined in claim 2, wherein said guide-clamping stop means on the other tubular member comprises another pin extending radially outward of the other tubular member, said connecting means comprising biasing means interconnecting both pins and thereby exerting said axially expansive force on the telescoped tubular members.

7. A frame member as defined in claim 6, wherein said biasing means comprises a tension spring extending axially between the two pins.

8. A frame member as defined in claim 6, wherein said biasing means further comprises an elongated closed loop member, the ends of the loop member each engaging respectively one of the pins so as to restrict axially expansive movement of the telescoped tubular members.

9. A frame member as defined in claim 8, wherein said biasing means further comprises a tension spring engaged on said loop member and bearing against said pins at opposite ends of the spring.

10. A frame member as defined in claim 6, wherein said offset portion of the slot has an oblique camming portion to guide the pin into the straight portion of the slot while the crossheads and tubular members are rotated with respect to each other.