

[54] ARTICLE OF FURNITURE

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Hatboro, Pa. 19040[22] Filed: **Mar. 10, 1972**[21] Appl. No.: **233,416**[52] U.S. Cl. 5/108, 5/93 R, 297/429,
297/281

[51] Int. Cl. A47d 9/02, A47d 7/01

[58] Field of Search 5/104, 108, 109;
248/376; 297/151, 153, 429; 272/86[56] **References Cited****UNITED STATES PATENTS**

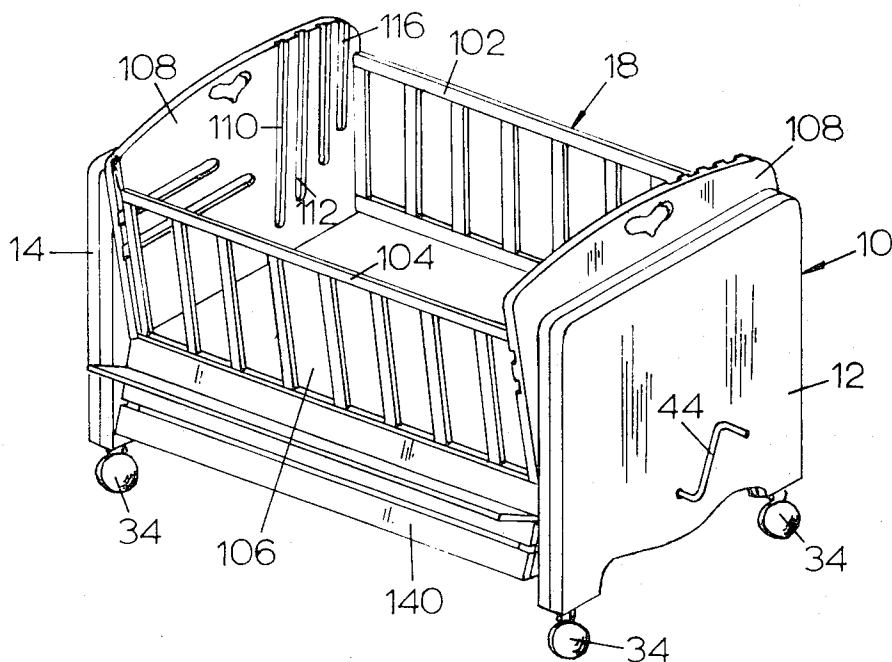
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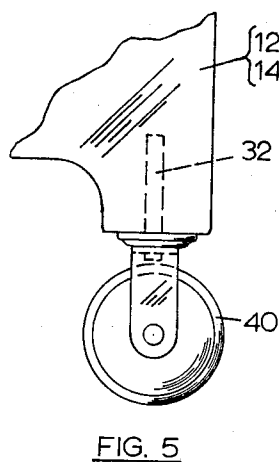
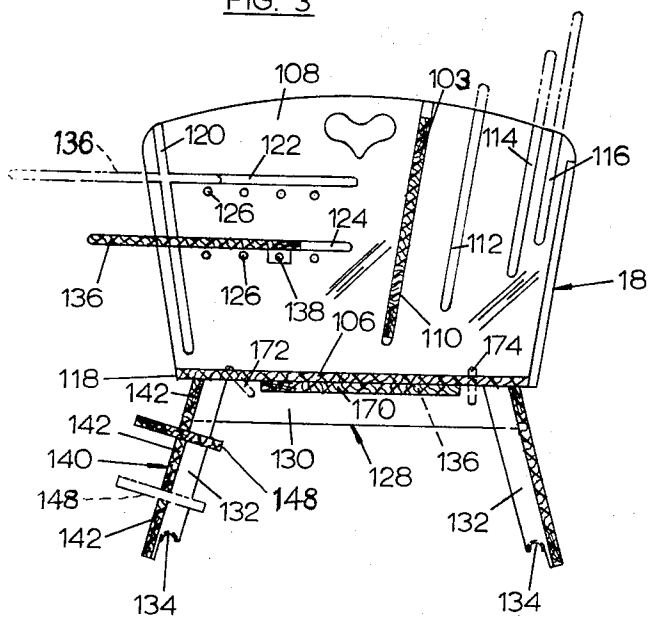
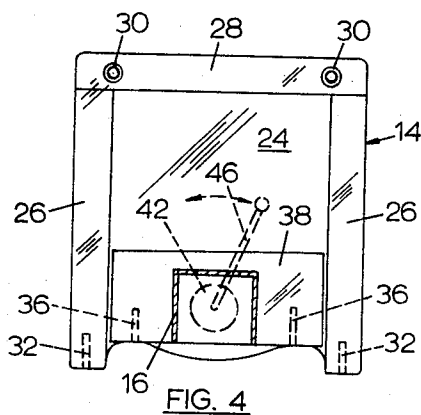
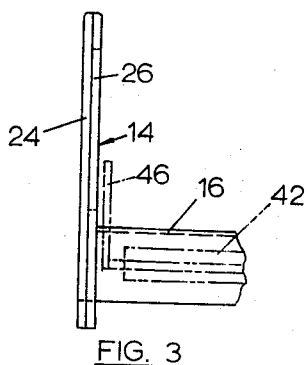
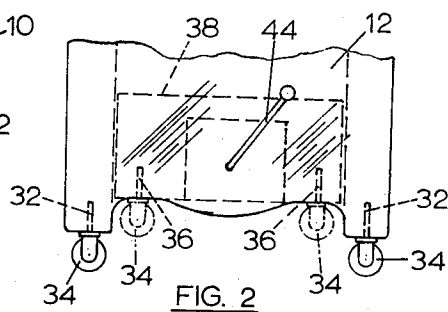
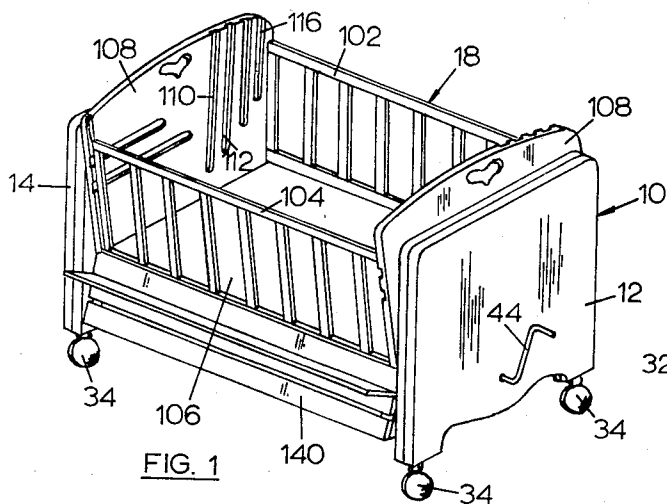
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[57]

ABSTRACT

An article of furniture of the swinging type including a base frame having head members at opposite ends between which a pair of U-shaped torsion suspending members extends to suspend a supporting unit adapted to receive one or more persons either in sitting or lying conditions. Various parts of the article of furniture are adjustable to adapt the same for use by children as well as adults. The legs of the U-shaped suspending members normally extend outwardly from each other at the outer ends thereof an appreciably greater distance than when said ends are pivotally connected to bearings in the head members of the base frame, whereby the suspending members are placed under compression type torsion to minimize and/or prevent appreciable longitudinal movement of the lower portions of the suspending members as well as the supporting unit connected thereto relative to the head members of the base frame.

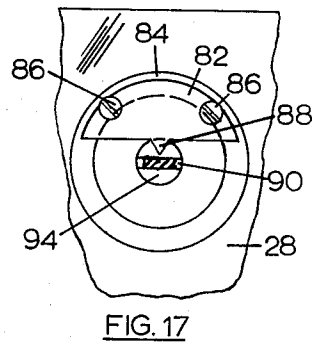
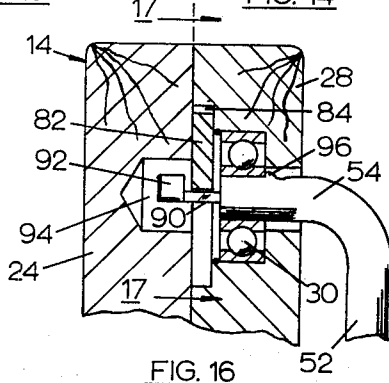
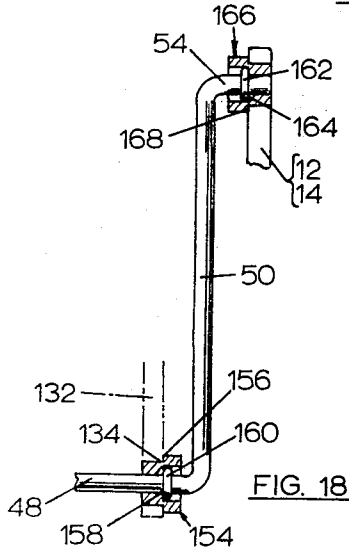
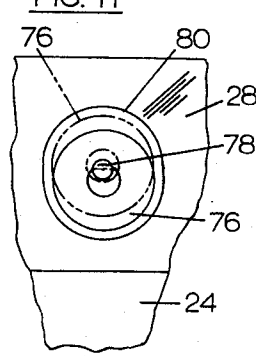
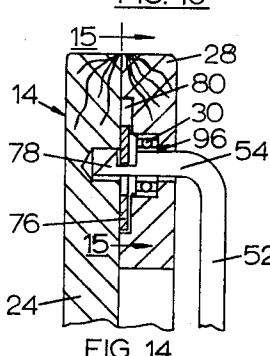
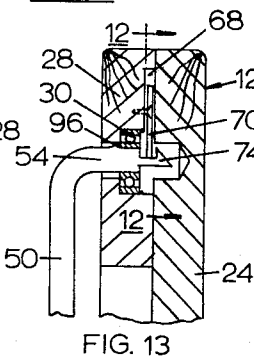
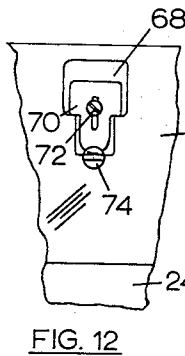
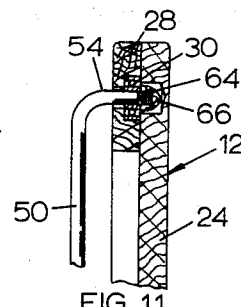
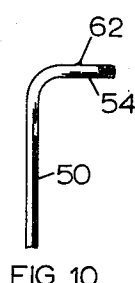
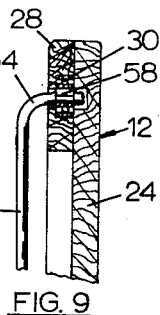
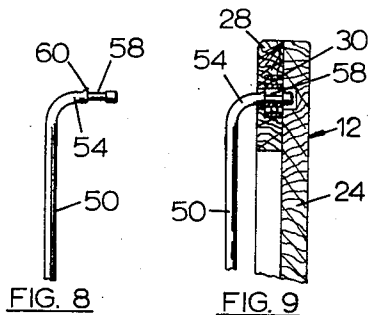
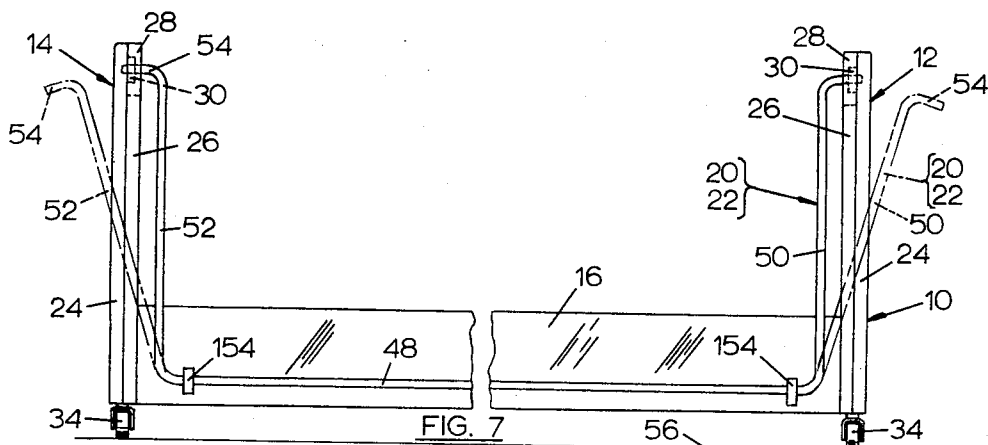
26 Claims, 23 Drawing Figures



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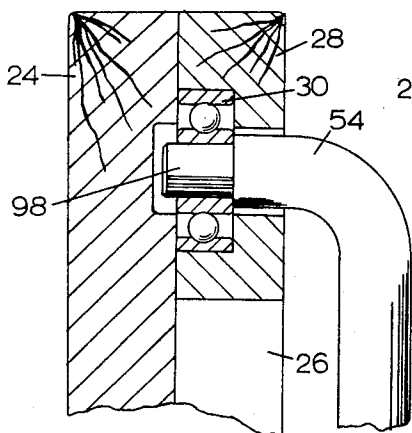


FIG. 19

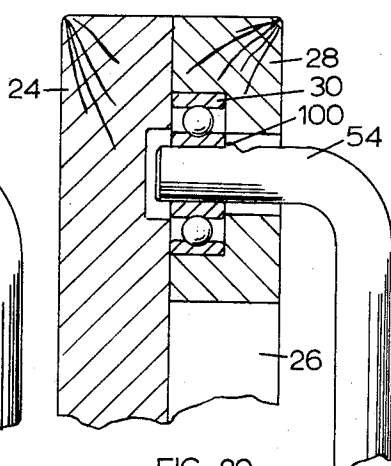


FIG. 20

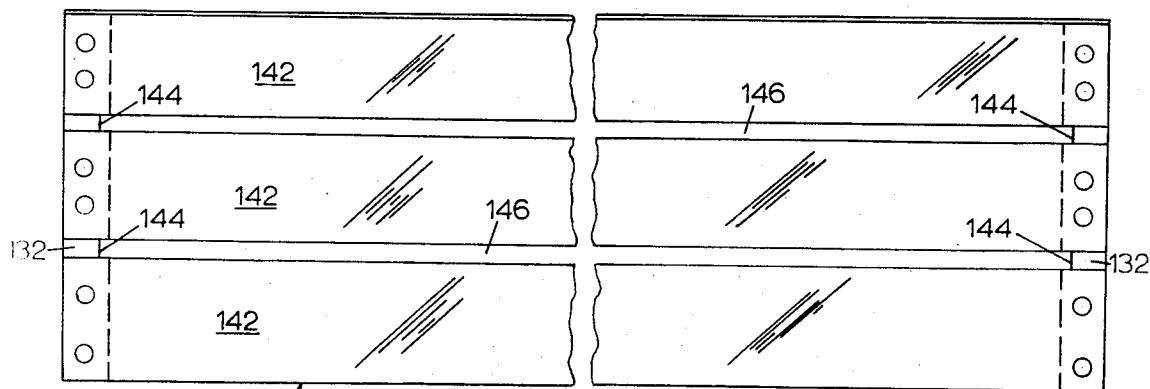


FIG. 21

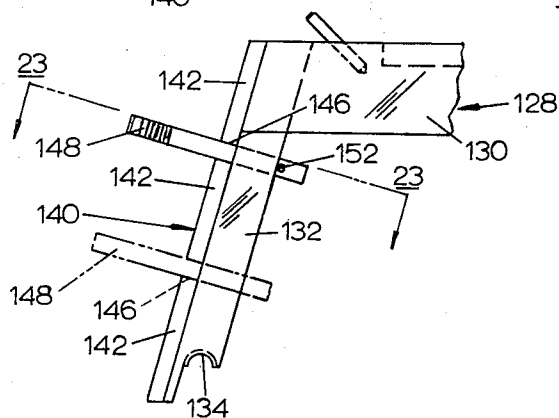


FIG. 22

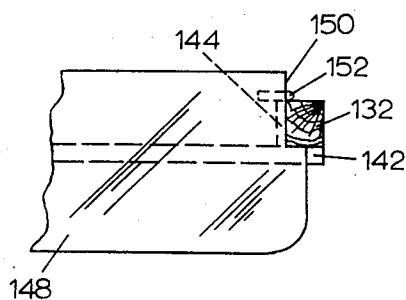


FIG. 23

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ARTICLE OF FURNITURE

CROSS-REFERENCE TO RELATED APPLICATION

This application comprises various innovations and improvements over applicant's co-pending application Ser. No. 2,994, filed Jan. 15, 1970, and now comprising Pat. No. 3,648,307, issued Mar. 14, 1972.

BACKGROUND OF THE INVENTION

Whereas applicant's prior Pat. No. 3,648,307 is directed to an article of furniture of the swinging type which is principally adapted to be used by children of various ages, it has now been realized that certain of the basic features of said article of furniture are highly adapted to be used not only by children but also by adults. Accordingly, by providing adjustable features in various portions and items of the structure, the same may be quickly adapted for use either by children of different sizes or by adults, and this aspect of the structure comprises one of the principal features of the present invention. In addition, the torsion type suspension members employed in said applicant's prior patent is of the tension type. It now has been found that an equally if not more desirable arrangement is that in which the U-shaped torsion members are of the compression type and this feature comprises another important part of the present invention.

Concerning the prior art, articles of furniture of the swinging type have been available for many years. So-called gliders have been available in which a base frame having vertical end members supports a couch or settee-like object by a plurality of chains or long links. Devices of this type have no appreciable control over the direction of swinging of the couch or settee-like part of the structure. Further, these devices have not been power-operated for automatic swinging operations.

Certain types of swinging cradles also have been available in the past. For example, Pat. No. 2,557,907, to Cranfill, Jr., et al., dated June 19, 1951, discloses a power driven-nursery cradle somewhat resembling a glider in base construction. Another patent of similar type comprises No. 2,860,727, to DePasqua, issued Nov. 18, 1958. This cradle also is of the glider type. Neither of the structures of these prior patents are adapted for either direct use or conversion to use by adults.

In order to make available an article of furniture of the swinging type which is adjustable and adaptable selectively to accommodate various sizes of children as well as adults, and also offer innovations and certain improvements over the structure of applicant's prior patent, the present invention has been devised and embodies the following objects.

SUMMARY OF THE INVENTION

It is the principal object of the invention to provide an article of furniture preferably of the swinging type which includes a base frame comprising a pair of head members extending vertically at opposite ends thereof and supporting therebetween a pair of substantially U-shaped torsion suspending members of the compression type, the legs of said members terminating in horizontal extensions disposed within bearings mounted within the upper portions of said head members and secured thereto against accidental removal by a plurality of different embodiments of interengaging latching elements capable of being operated quickly and also per-

mitting release and disconnection without requiring the use of tools.

It is another object of the invention to provide reinforcing arrangements in the head members of the base frame, particularly under circumstances where the head members are formed from wood, such reinforcing means not only strengthening the head members but also providing appropriate means to provide bearings within which casters may be disposed in the lower ends of the head members to permit selective spacing of the head members and particularly the horizontal seat member at different elevations with respect to a supporting surface such as a floor and thereby facilitate adaptation of the article of furniture for use by persons of a wide range of heights.

Although the article of furniture is highly useful as a cradle for infants and small children, in order to further adapt the use of said article of furniture to a wide range of persons of different heights and sizes, including children and adults, it is a further object of the invention to provide what is designated as the supporting unit with a back panel that is capable of being disposed at different transverse locations relative to the forward edge of the seat portion of said supporting unit and, correspondingly, at different heights relative to the seat portion and thereby adjust said back panel to being engaged by the back of a person seated in the supporting unit, regardless of size, at least within reasonable limits.

Ancillary to the foregoing object, it is an additional object to provide the supporting unit with a foot rest adapted to be positioned adjustably at a plurality of different levels below that of the seat panel of the supporting unit and thereby permit use of the foot rest by different persons of a relatively wide range of sizes.

Further, ancillary to the foregoing object, it is still another object of the invention to provide said supporting unit with a horizontal tray panel which is adapted to be positioned at a plurality of different levels above the seat panel of the supporting unit in order that infants, children and even adults may use the tray panel either for purposes of writing or drawing, or serving of food and beverages and the like.

Details of the foregoing objects and of the invention as well as other objects thereof, are set forth in the following specifications and illustrated in the accompanying drawings comprising a part thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an article of furniture embodying the principles of the present invention.

FIG. 2 is a fragmentary lower portion of one of the head members of the base frame of the article of furniture shown in FIG. 1 and illustrating in phantom an alternate height arrangement which is different from that illustrated in full lines.

FIG. 3 is a fragmentary edge view of one head member of the base frame of the article of furniture shown in FIG. 1.

FIG. 4 is a side elevation of the fragmentary portion of the base frame shown in FIG. 3.

FIG. 5 is a fragmentary, enlarged, elevation of an alternate height adjusting means from that shown in FIG. 2.

FIG. 6 is a vertical sectional view taken substantially midway of the length of the supporting unit of the article of furniture shown in FIG. 1 and illustrating in full lines various positions of the back panel, tray panel and

foot rest of the supporting unit and, in phantom, showing alternate adjusted positions thereof to illustrate the adaptability of the supporting unit to accommodate persons of different heights and sizes.

FIG. 7 is a front elevation of a U-shaped torsion suspending member showing the legs thereof in phantom disposed in the inoperative position thereof and, in full lines, showing the legs disposed in compressed operative position and supported thereon by head members of the base frame in accordance with the principles of the invention.

FIG. 8 is a fragmentary elevation of the upper end portion of one of the legs of the U-shaped suspending member illustrated in FIG. 7 and showing one embodiment of construction thereof.

FIG. 9 is a fragmentary vertical sectional view of a portion of one of the head members of the base frame with the embodiment of the supporting member shown in FIG. 8 mounted within a bearing in said head member.

FIG. 10 is a view similar to FIG. 8 but showing a further embodiment of upper end construction of one leg of the U-shaped suspending member shown in FIG. 7.

FIG. 11 is a view similar to FIG. 9 but illustrating the embodiment of suspending member shown in FIG. 10 positioned within a bearing in the sectionally illustrated head member of the base frame shown therein.

FIG. 12 is a fragmentary elevation showing a latch member to secure one embodiment of upper end portion of the U-shaped suspending member shown in FIG. 7 as seen on the line 12—12 of FIG. 13.

FIG. 13 is an enlarged fragmentary view similar to FIGS. 9 and 11 and illustrating the embodiment of latch means shown in FIG. 12 in engagement with the embodiment of U-shaped suspending member engaged by said latch member.

FIG. 14 is a fragmentary sectional view similar to FIG. 13 but showing a further embodiment of one end of a U-shaped suspending member of the type shown in FIG. 7 engaged by a still further embodiment of latch means, the end of the U-shaped suspending member shown in FIG. 14 being at an opposite end of the member from that shown in FIG. 13.

FIG. 15 is a fragmentary elevation taken on a line 15—15 of FIG. 14 and showing an elevational face view of the latch member shown in FIG. 14.

FIG. 16 is a view similar to FIG. 14 and illustrating a still further fragmentary embodiment of latch means in engagement with one of the upper end portions of the U-shaped suspending member of the type shown in FIG. 7.

FIG. 17 is a view similar to FIG. 15 but showing the latch member embodiment shown in FIG. 16 as seen on the line 17—17 of FIG. 16.

FIG. 18 is a fragmentary elevation of an exemplary leg of the U-shaped suspending member of the type shown in FIG. 7 and illustrating certain embodiments of supporting bearings associated with said leg.

FIGS. 19 and 20 respectively are fragmentary vertical elevations illustrated on a larger scale than in the preceding figures and showing two different embodiments of positioning means on the ends of the U-shaped suspending member of the type shown in FIG. 7 in association with anti-friction bearings mounted in the vertical head members of the base frame.

FIG. 21 is a foreshortened vertical elevation of additional supporting means attached to the supporting unit

of the article of furniture shown in FIG. 1 and adapted to support a foot rest panel in several different vertical positions.

FIG. 22 is a fragmentary end elevation of the right-hand end of the additional supporting means shown in FIG. 21 and illustrating in full lines the foot rest panel in one operating position and, in phantom, showing said panel in a different, lower supporting position.

FIG. 23 is a fragmentary sectional plan view of the construction shown in FIG. 22 as seen on the line 23—23 thereof.

DETAILED DESCRIPTION

Referring to FIGS. 1 and 2 in particular, it will be seen that the article of furniture embodying the principles of the present invention essentially comprises a substantially U-shaped base frame 10 comprising vertical head or end members 12 and 14 which are connected by a horizontal bottom or lower connecting member 16. A supporting unit 18, which is of multi-use type, is swingably supported by a pair of U-shaped torsion suspending members 20 and 22 of compression type which are suspended in bearings, to be described, mounted in the upper portions of the head members 12 and 14 and from which bearings the U-shaped suspending members depend. Various types of latch means are illustrated for purposes of detachably connecting the upper ends of the legs of the U-shaped suspending members from the bearings therefor. Details of the various members and units of the overall article of furniture are as follows.

THE BASE FRAME

The head members 12 and 14 may be suitably formed from any appropriate material, such as wood, synthetic resin, metal or otherwise. In the particular illustration shown in detail in the drawings of the application, wood has been selected as the exemplary material but the same is not to be regarded as restrictive. When formed from wood, the head members 12 and 14 comprise outer, preferably solid panels 24. In the various illustrations, especially where an individual head member has been identified by reference character, it is to be understood that said structure equally applies to the opposite head member so as to minimize the use of reference numerals.

The end panels 24 may be formed either from solid or laminated wood and particularly the outer surfaces thereof are adapted to be appropriately finished to resemble an attractive article of furniture. With reference to FIG. 4 which pertains to head member 14 specifically, in view of the illustration being related to that shown in FIG. 7, the end panel 24 of each head member is appropriately reinforced by edge strips 26 which are of suitable width and, for example, may be similar in thickness to that of the end panels 24. Extending across the upper ends of the edge strips 26 is a horizontal top strip 28 which may be of similar dimensions to the edge strips 26. The end panels 24 and reinforced strips 26 and 28 are securely connected together by appropriate adhesives or other techniques commonly employed in the furniture manufacturing industry. The top strip 28 also supports a pair of bearings 30 and in view of the location thereof, it will be seen that adequate support therefor is provided by the composite head members 12 and 14 and, specifically, the location of

the bearings adjacent the upper ends of the edge strips 26.

The added thickness afforded the end panels 24 by means of edge strips 26 is utilized to drill suitable vertical sockets 32 into the lowermost edge portions of the head members 12 and 14 for purposes of receiving the stems of suitable casters 34, as shown in full lines in FIG. 2. In addition however, for purposes of regulating the height of the supporting unit 18 above a supporting surface such as a floor, the casters 34 may be mounted in additional sockets 36 which are drilled into the lower edge of each of the head members 12 at an elevation higher than the lower ends of the edge strips 26 for example, as clearly shown in FIG. 2. For purposes of providing adequate thickness to support the casters in the auxilliary sockets 36, an additional reinforcing panel 38 is firmly affixed to the end panels 24 on the inner surfaces thereof. The panels 38 preferably are of similar thickness to the edge strips 26 for example. The difference in elevation between the alternate positions for the casters 34, as shown in FIG. 2, may be of the order of 2 or 3 inches. It also is feasible to achieve height adjustment for the panels 12 and 14 by utilizing the casters 40 shown in FIG. 5 for example, which may be of substantially larger diameter than the casters 34 shown in FIG. 2. Accordingly, a wide range of vertical adjustment is made possible by the above-described mechanisms and arrangements.

The head members 12 and 14 are firmly secured in vertical position and parallel to each other by means of the bottom connecting member 16 which may be formed from wood, if desired, but preferably from metal. Any suitable means, such as flanges, screws, bolts or otherwise, not shown, may be employed to effect such firm connection of the bottom connecting member 16 to said end members. In addition to serving to secure and space the end members in operative position, the bottom connecting member 16 also serves as a housing for the motor 42 which is illustrated in phantom in FIGS. 3 and 4 in exemplary manner. For details of the motor, attention is directed to applicant's Pat. No. 3,648,307 referred to above. Said motor may be of the spring type, for example, operated by a crank 44. The motor also may operate an oscillating actuating bar 46, shown in phantom in FIG. 4, the same preferably being located adjacent the inner surface of the head member 14, for example, as shown in exemplary manner in FIG. 3, for purposes of engaging a pin, not shown, on one end of the supporting unit 18, for example.

Referring particularly to FIG. 7 and also the additional FIGS. 8 through 20, details of the U-shaped torsion suspending members 20 and 22 are illustrated. Said suspending members comprise a substantially horizontal lower portion 48 and a pair of similar legs 50 and 52. The upper ends of the legs 50 and 52 terminate in substantially horizontal pivot extensions 54, which respectively are received within the inner races of the anti-friction bearings 30, specifically as shown in various figures on sheet 2 of the drawings and, specifically, FIG. 7. It also will be seen from the various figures and specifically FIGS. 9, 11, 13, 14 and 16 that the anti-friction bearings 30 are disposed within appropriate sockets provided in the inner surface of the top strips 28 of the head members 12 and 14. Obviously, the bearings are disposed within the sockets prior to the strips 28 being secured to the end panels 24 of each of

the head members. Also, the top strips 28 are provided with suitable openings coaxial with the bearings for purposes of receiving the horizontal pivot extensions 54 on the legs of the U-shaped suspending members 20 and 22.

Referring to FIG. 7, it will be seen that the exemplary U-shaped torsion suspending member is identified by the two reference numerals 20 and 22 in view of the fact that in side elevation, they overlie each other. For purposes of brevity, only the suspending member 20 is referred to in the following description. The normal in-operative position of the U-shaped suspending member is as illustrated in phantom in FIG. 7. In this position, it will be seen that the legs 50 and 52 thereof are disposed at an obtuse angle greater than 90° to the horizontal lower portion 48 of the suspending member. Said members are formed from appropriate metal such as steel and are suitably resilient. Rods of a 5/16 inch diameter have been found to be highly adequate for practical use to support body loads of as much as 500 pounds without serious deflection. When the members 20 and 22 are mounted in operative position between the head members 12 and 14 however, the upper ends of the legs 50 and 52 are moved toward each other adequate amounts to enable the pivot extensions 54 to be disposed within the bearings 30. When released, the legs 50 and 52 preferably are substantially parallel to each other and vertical when in normal operative position, such as when the article of furniture is supported upon a horizontal floor surface 56 or the like. Also, when in depending, operative position, the legs at the opposite ends of the U-shaped suspending members 20 and 22 are substantially parallel to each other when viewed from one end of the base frame 10 for example. In view of this, swinging movement of the supporting unit 18 will always be under conditions where the unit is substantially parallel to the supporting surface 56 for example.

After the suspending members 20 and 22 have been mounted in operative position within the bearings 30 in the head members 12 and 14, the flexing of the legs 50 and 52 thereof substantially into the operative, parallel relationship of the same to each other results in forming a compression type torsion within the rods which comprise the suspending members and this very adequately serves the purpose of minimizing if not normally substantially preventing any longitudinal, horizontal movement of the lower portions 48 of the rods relative to the base frame 10. In this respect, the torsion rods of the present invention differ from those comprising part of the subject matter of applicant's aforementioned Pat. No. 3,648,307. In addition, the assembly of such compression type torsion suspending members is easier than the tension type of said prior patent. This feature also permits the utilization of a number of different embodiments of latching means for the pivot extensions 54 of the U-shaped suspending members 20 and 22, as described in detail hereinafter.

PIVOT AND LATCHING MECHANISMS

Referring to FIGS. 8 and 9, one embodiment of means to connect the pivot extensions 54 to the bearings 30 comprises forming a section 58 of reduced diameter whereby, as shown in FIG. 9, when the extension 54 is disposed within the inner race of the bearing 30, the inner race will be disposed within part of the reduced section 58. Also, to prevent excess movement of

the extension 54 into the inner race of the bearing, an enlargement 60 may be formed on the extension 54 adjacent the reduced section for purposes of abutting the face of the inner race and thereby restrict further movement axially. By slightly raising the pivot extension 54 relative to the inner race, it will be disposed coaxially with said race and thereby permit withdrawal of the extension from the bearing.

In the embodiment shown in FIGS. 10 and 11, the pivot extension 54 may be provided with an enlargement 62, which actually comprises a stop which functions similarly to the enlargement 60 in the embodiment shown in FIGS. 8 and 9, but it will be seen from FIGS. 10 and 11 that the pivot extension 54 is of the same diameter as the leg 50. In FIG. 11 it will be seen that a recess 64 is formed within the end panel 24 to receive a so-called "speed nut" 66 of well-known friction type which operates in the manner of a one-way clutch which frictionally engages the terminal end of the pivot extension 54 and secures the same against ready withdrawal from the bearing 30 except when abnormal force is applied.

Several embodiments of movable latch type connecting means are illustrated respectively in FIGS. 12 and 13 and in FIGS. 14 and 15 as follows. In FIGS. 12 and 13, it will be seen that the top strip 28, for example, is provided with a shallow recess 68 on its inner surface, for purposes of receiving a flat, slideable latch member 70 which, if desired, may have a suitable guide slot formed therein to receive a guide pin 72 to limit the vertical movement of the latch 70. In this embodiment the terminal end of the pivot extension 54 is provided with a hook-like, cam-surfaced retainer 74 which is shown in side elevation in FIG. 13. The cam surface on the end of the retainer 74 will operate to elevate the gravity-operated latch member 70 from its lower position, when inserting the pivot extension 54 within the bearing 30. After the cam surface of the retainer has passed beyond the latch however, the latch then may drop behind the cam-surfaced portion of the retainer, as shown in both FIGS. 12 and 13, and thereby prevent withdrawal of the pivot extension from the bearing. However, if withdrawal is desired, it is only necessary to invert, for example, or otherwise move the base frame 10 from its normal, upright operative position, sufficiently to enable gravity to cause the latch to move away from the retainer 74 and thereby free the same from latching contact by the latch 70.

In FIGS. 14 and 15, another embodiment of gravity-operated latch means is illustrated in the form of a conventional washer disc 76 which, for example, has an opening of suitable diameter to pass the retainer 78 therefrom which is similar in shape and function to the retainer 74 of the embodiment shown in FIG. 13. The latch member 76 is disposed within a somewhat oval-shaped shallow recess 80. The cam surface on the retainer 78, upon inserting the pivot extension 54 into the bearing 30, will raise the circular latch member 76 to the phantom position thereof shown in FIG. 15 for example, until the retainer is fully passed through the opening in the circular latch member 76 and then the latter will drop behind the retainer hook portion to secure the pivot extension 54 against removal. However, as in regard to the preceding embodiment, the base frame 10 may be moved substantially from its normal upright position, such as by approximately inverting the same and gravity then will operate to move the latch

member 76 from its latching position to an elevated position in which the pivot extension 54 may be withdrawn from the bearing 30.

In FIGS. 16 and 17, a stationary type of latch member is illustrated which comprises a segment member 82 which is mounted within a suitable shallow recess 84 and made stationary therein by any suitable means such as appropriate screws 86 or the like. The member 82 has a detent 88 formed thereon which is positioned to be received with a reduced portion 90 formed near the terminal end of the pivot extension 54. From FIG. 16 it will be seen that the actual terminal end 92 of the pivot extension 54 will encounter the detent 88 if withdrawal of the same from the bearing 30 is attempted, if the legs 52 are in normal, depending position. However, the clearance 94 on the reduced portion 90 of the pivot extension 54 will, if moved so as to be disposed uppermost, permit withdrawal of the pivot extension 54 from the bearing 30. This may be done such as when the suspending members 20 and 22 are moved substantially to a position where the horizontal lower portion 48 thereof is more or less overhead with respect to the base frame 10.

In the various foregoing latch mechanisms illustrated and described with respect to FIGS. 12 - 17, it is to be understood that the pivot extensions 54 preferably are provided with projections or enlargements 96 which abut the outermost faces of the bearings 30 and limit insertion movement of the extensions 54 into said bearings. Also, it will be seen that the panel members 24 are provided with appropriate recesses within which the actual terminal ends of the various pivot extensions 54 are disposed. Moreover, and importantly, all of the latching and supporting mechanisms are concealed within the interior of the composite upper portions of the head members 12 and 14 as a result of the various recesses adjacent the bearings 30. Accordingly, particularly when the articles of furniture are arranged for use by young children, the pivot means for the U-shaped suspending members defy tampering by the occupants, whereby the furniture is safe to use and at least disconnection of the suspending members from the base frame is normally not possible to be achieved by such occupants.

Referring to FIGS. 19 and 20, if it is desired to utilize relatively simple means to connect the pivot extensions 54 to the bearings 30, this may easily be accomplished by either providing a terminal end 98 of reduced diameter for reception within the interrace of the bearing 30, as shown in FIG. 19 or, referring to FIG. 20, the pivot extension 54 may be of the same diameter at its terminal end as in other portions and an appropriate projection 100 may be formed therein by suitably slightly upsetting the metal in order that the projection 100 will restrict the movement of the pivot extensions 54 into the interrace of the bearing 30.

ADJUSTABLE TYPE SUPPORTING UNIT

Attention is directed to FIGS. 1 and 6 in which the details of the preferred embodiment of supporting unit 18 are illustrated. In FIG. 1, it will be seen that as arranged, the supporting unit 18 is adapted to be used as a cradle due to the provision of an appropriate back panel 102 and a so-called front panel 104. The unit 18 also includes a horizontal panel 106 which serves either as a seat surface or as a part of a crib, depending upon the type of individual occupying the same. The unit 18

also includes similar, parallel end members 108. These end members, as well as the horizontal panel 106 and the back and front panels 102 and 104, may be formed from wood, synthetic resin, metal or other appropriate materials, as explained above with respect to the base frame 10. All of the elements of the unit 18 may be attractively finished to resemble fine furniture and especially as viewed from FIG. 6, it will be seen that the end members 108 may be attractively contoured and finished with decorative motifs.

The end members 108 also are of sufficient thickness to permit the incision of a series of preferably parallel slots 110-112-114-116. In FIG. 6 in particular, it will be seen that the lower ends of the slots are disposed at progressively greater distances from the seat panel 106, for example, as said slots are disposed at progressively greater distances from the front or forward edge 118 of the seat panel 106. In addition, it will be seen that the end members 108 are provided adjacent the forward upright edges with additional somewhat vertical slots 120 which are parallel to the forward edges. It will be understood that the slots referred to above are all formed on the inner surfaces of the members 108 and therefore face each other at opposite ends of the unit 18.

The end members 108 also are formed with a pair of additional substantially horizontal slots 122 and 124 which are vertically spaced apart and, in addition, rows of shallow holes 126 are formed in said inner faces of the end members 108, for purposes to be described.

The portion of the supporting unit 18 which includes the horizontal panel 106 and the end members 108 is separable from the lower, substantially U-shaped additional supporting frame 128 shown in FIG. 6. Said additional supporting frame 128 comprises horizontal members 130 and depending members 132 extending downwardly from opposite ends thereof. To a large extent, the additional supporting frame 128 is similar to a corresponding frame in applicant's aforementioned Pat. No. 3,648,307, but the present invention includes certain additional adjustable features not included in said prior patented structure, details of which are described hereinafter. In regard to the mechanism by which the upper portion of the unit 18 is connected to the additional supporting frame 128 however, attention is directed to certain connecting details therefor which are described or claimed in said prior patent. It is to be understood that the horizontal members 130 and depending members 132 are connected together and a plurality of these are arranged longitudinally along the additional supporting frame 128 and particularly at the ends thereof for purposes of the depending members having recesses 134 formed in the lower ends thereof and especially at the opposite ends of the additional supporting frame 128, for purposes to be described.

In view of the separable nature of the upper portion of the unit 18 from the additional supporting frame 128 which is connectable to the lower surface of the horizontal seat panel 106 of the unit 18, said upper portion may be used either as a car bed, either when connected to the supporting frame 128 or separated therefrom. Also, when the unit 18 and the supporting frame 128 are connected but are not supported by the suspending members 20, the assembled unit may be used as a child's seat or, if the front panel 104 is removed, the unit may be used as a settee. Further details of such

uses are set forth in said aforementioned patent of the applicant and to which attention is directed.

In accordance with the present invention, the primary improved characteristics of the supporting unit 18 comprise its adaptability to accommodate a substantially wide range of sizes of people and particularly the heights thereof in regard to using the entire article of furniture for a number of different uses, some of which are typically characteristics of infants and small children, while others are characteristic of older children and adults. These advantages are derived from the fact that the base frame 10, for example, is adapted to be disposed at a range of different heights with respect to a supporting surface such as the floor 56, whereby the unit 18, especially when used for adult purposes, may serve as a settee and comfortably accommodate, for example, a child, a teenager or adult such as by arranging an auxiliary back panel 103, selectively, in an opposing pair of the slots 110, 112, 114 or 116, so that the proper depth of seating surface on the panel 106 may be occupied while, at the same time, the elevation of the back panel 103 will be such as to engage the back of the seated person at a comfortable location.

In addition to the positioning of the back panel 103 in accordance with the foregoing description, the slots 122-124 in the opposing surfaces of the end members 108 may be used to position a tray panel 136 at the most comfortable level for the size of the person seated upon the surface 106. By way of example, if an infant or young child is seated in the supporting unit 18, the preferred location of the auxiliary back panel 103 would probably be within the slots 110, while the most suitable location for the tray panel 136 would be in the pair of lower horizontal slots 124. Further, the opposite ends of the tray panel 136 are provided with latch units 138, see FIG. 6, such as slide bolts which are secured to the lower surfaces of the tray panel 136 at opposite ends thereof and the bolts thereof respectively are slideable into a selected pair of the holes 126 in the end members 108. It will be understood that during the use of the unit 108 for seating purposes, the front panel 104 will be removed from the slots 120 provided therefor. It is also to be understood that the permanent back panel 102 is always permanently fixed along the rear portion of the unit 18, by connection to the parallel end members 108 to brace them, such as shown in FIG. 1. Only auxiliary back panel 103 is adjustably positionable in the slots 110 - 116 in the manner described above.

Further to improve the comfort of using the supporting unit 18 for example, as well as the article of furniture of which it comprises an important part, the depending members 132 nearest the front edge 118 of the seat panel 106 are provided with additional supporting means 140, which is shown in FIGS. 1 and 6. Said means preferably comprise a plurality of slats 142 which are secured at the ends thereof to the depending members 132 as best shown in FIG. 21. Suitable screws or nails may be used for such purpose. In addition, the inner surfaces of the depending members 132 are provided with transversely extending slots 144, best shown in FIG. 21, which cooperate with the longitudinal slots 146 which are of even width and provided by the edges of the slats 142.

The slots 146 are of a width substantially equal to the thickness of a foot rest panel 148 which is coextensive in length with the supporting means 140. The opposite

rear corners 150 of the foot rest panel 148 are cut out to receive portions of the depending members 132, as best shown in FIG. 23, and thereby serve to provide positioning means which limit the insertion of the inner edge of the foot rest panel 148 within one of the slots 146, depending upon the height desired for the foot rest panel relative to the horizontal seat panel 106. To detachably secure the foot rest panel in one of the alternate positions provided therefor, as shown in FIG. 23, a so-called bullet-type latch button 152, which is spring-pressed outwardly, relative to the opposite ends of the foot rest panel 148, is adapted to snap outwardly beyond the rearward surfaces of the depending members 132 as shown in FIG. 23 for purposes of preventing accidental disconnection of the panel 148 from its supporting means. It is to be noted that the transverse slots 144, as well as the relatively close fit of the foot rest panel 148 within the slots 146 provide relatively firm support for the foot rest panel 148 when disposed in either of the slots 146. Panel 148 also may be placed in slots 120, above tray panel 136, as a guard for infant self-feeding and play.

The lower horizontal portions 48 of the suspending members 20 and 22, adjacent opposite ends thereof and in close proximity to the legs 50 and 52 thereof, are provided with appropriate annular bearings 154 which respectively are received in the recesses 134 provided in the lower ends of the depending members 132 of the additional supporting frame 128. Gravity is adequate to maintain the bearings positioned within the recesses 134. Particularly for purposes of retaining the bearings within said recesses, attention is directed to FIG. 18 in which it will be seen that the bearings 154 are annular and also are provided with an exterior shoulder 156 which abuts the outer surfaces of the depending members 132 for example, fragmentarily illustrated in FIG. 18, and the bearing 154 also is provided with an internal shoulder 158 against which a suitable enlargement 160 is adapted to abut for purposes of positioning the bearing 154 against longitudinal movement relative to the horizontal lower portion 48 of the suspending members 20 and 22.

If desired, the horizontal pivot extensions 54 in the upper ends of the legs 50 and 52 also may have an enlargement 162 formed thereon for engagement with an internal shoulder 164 formed within a bushing-type bearing 166 in order to force an exterior shoulder 168 on said bearing against the inner face of the head members 12 and 14. The bushing-type bearings 166 will be maintained in the operative position illustrated in FIG. 18 by virtue of the compression-type torsion forces exerted by the legs 50 and 52 of the supporting members 20 and 22 relative to the horizontal lower portions 148 of said members. If desired, the bearings 154 and 166 may be suitably formed from appropriate plastics and especially those of the self-lubricating type such as sold under the trademarks, DELRIN, and TEFLON. However, if desired, they may be formed from suitable bearing-type material of any appropriate composition.

From the foregoing it will be seen that the present invention provides an article of furniture offering substantially improved characteristics and features over those afforded by the basic structure of applicant's prior Pat. No. 3,648,307 and particularly in regard to providing furniture which may be utilized by a wide range of ages and sizes of persons, extending from infants to grown adults in order to furnish enjoyment and

comfort while being utilized for a substantial number of different purposes. Adjustment to adapt the article of furniture to such different sizes of persons is easily and readily accomplished without the use of tools and without exertion of any special physical forces. The material intended to be used in manufacturing the same is such that the furniture is long-lasting and can be made highly attractive in appearance. When, for example, the tray panel 136 is not desired to be used, it readily may be stored within suitable recesses 170 formed in the upper surfaces of the horizontal members 130 of the additional supporting frame 128 as best shown in FIG. 6. Further, appropriate, angularly related pins 172 and 174 are fixed to the horizontal members 130 adjacent opposite ends of the additional supporting frame 128 for reception within complementary holes formed in the lower edges of the opposite ends of the supporting unit 18. For practical purposes, gravity is adequate to maintain the unit 18 in operative relationship with the additional supporting frame 128.

While the invention has been described and illustrated in its several preferred embodiments, it should be understood that the invention is not to be limited to the precise details herein illustrated and described since the same can be carried out in other ways falling within the scope of the invention as illustrated and described.

I claim:

1. An article of furniture of the swinging type comprising in combination, a base frame comprising a pair of head members normally vertical when in use and substantially parallel to each other in fixed relationship and spaced apart a predetermined distance by a connecting member affixed at its ends respectively to said head members adjacent the lower portions thereof, a supporting unit positioned between said head members and adapted to receive and support a human body, a pair of similar substantially U-shaped torsion suspending members extending between said head members and the ends of the legs of said members being pivotally connected to said head members adjacent the upper ends thereof respectively adjacent the opposite vertical edges thereof, the upper ends of said legs of said members when not connected to said head members extending away from each other a greater distance when not connected to said head members than when they are connected thereto, whereby said torsion members are under compressive tension load when supported in operative position between said head members to resist movement of the horizontal lower portions of the torsion members longitudinally of themselves, and means connecting said supporting unit to said horizontal lower portions of said torsion members between the legs thereof for swinging support by said members.

2. The article of furniture according to claim 1 in which said head members include reinforced vertical edge means adapted to support pivots on said ends of said legs of said U-shaped torsion suspending members.

3. The article of furniture according to claim 2 in which said head members additionally include a horizontal reinforcing member extending between the upper ends of said reinforced vertical edge means.

4. The article of furniture according to claim 3 in which said horizontal reinforcing member in each head member is provided with bearings to receive the pivots of said U-shaped torsion suspending members.

5. The article of furniture according to claim 3 in which said head members are formed from wood and each comprises a panel providing an outer surface for each head member and said reinforcing means comprising strips of reinforcing material attached to the inner surfaces of said panels.

6. The article of furniture according to claim 1 in which said head members additionally include bearings and said legs of said U-shaped torsion suspending members having substantially horizontal pivot extensions on the upper ends of said legs for reception within said bearings in said head members, and said pivot extensions and bearings including co-engaging means operable to prevent accidental separation of said pivot extensions from said bearings and comprising recesses formed in said pivot extensions and detent-type locks adjacent said bearings and received in said recesses.

7. The article of furniture according to claim 6 in which said detent type locks comprise movable members maintained by gravity in said recesses when disposed in operative position to latch said pivot extensions against removal from said bearings.

8. The article of furniture according to claim 6 in which said co-engaging means are concealed within recesses formed in said head members.

9. The article of furniture according to claim 6 in which said detent type locks are disposed by gravity within said recesses when said article of furniture is disposed in normal upright operative position in which said torsion members substantially depend from said bearings in said head members, and said detents being disengageable from said recesses when said head members are moved substantially to inverted position from the normal upright position thereof.

10. The article of furniture according to claim 6 in which said bearings comprise anti-friction bearings mounted in said head members and supporting said pivot extensions on said legs of said suspending members and said co-engaging means being positioned on the interior of said head members rearwardly of said bearings therein.

11. The article of furniture according to claim 6 in which said bearings are of the anti-friction type and are mounted within said head members, said bearings receiving said horizontal pivot extensions on the upper ends of said torsion suspending members, and said pivot extensions including stop means engageable with said bearings for each pivot extension and adapted to limit movement of said pivot extensions into said bearings.

12. The article of furniture according to claim 11 further including friction nuts mounted on the terminal ends of said pivot extensions and disposed inwardly of said bearings within the interior of said head members.

13. The article of furniture according to claim 1 in which the horizontal lower portions of said U-shaped torsion suspending members are provided with stop means adjacent the opposite ends of said lower portions, and bearings also being provided upon said lower portions adjacent said stop means, and said supporting unit having means depending therefrom adjacent opposite ends thereof and said means being provided with recesses adapted to receive said bearings mounted upon said lower portions of said torsion members, said stop means being operable to prevent any appreciable movement of said supporting unit longitudinally along said lower portions of said torsion members.

14. The article of furniture according to claim 13 in which said bearing members are annular and are provided with recesses adapted to at least partially receive said stop means, said bearing members also being provided with shoulders adapted to abut portions of the recesses in said depending means of said supporting unit and thereby secure said bearing members in operative position with respect to said stop means.

15. The article of furniture according to claim 1 in which said head members are each provided with a plurality of different levels on the lower ends thereof adjacent the opposite sides of said head members, said different levels respectively being provided with means to receive casters selectively and thereby vary the height of said supporting unit above a supporting surface.

16. An article of furniture comprising a base frame having vertical end members connected to the ends of a horizontal connecting member, a supporting unit having a horizontal seat to receive and support a person, torsion type supporting members pivotally connected to said end members and said supporting unit to suspend said supporting unit from said end members for transverse horizontal movement relative to said base frame, means to support said base frame at different adjustable vertical levels relative to a supporting surface, additional supporting means interconnected to said horizontal seat below the level thereof and adjacent the forward edge thereof, and a foot rest engageable with said support means selectively at a plurality of different levels according to the level at which said base frame is supported upon a supporting surface and thereby accommodate said article of furniture to persons of a range of different heights and sizes.

17. The article of furniture according to claim 16 in which said foot rest comprises a panel extending outwardly from said additional supporting means and said additional supporting means having a plurality of slots at different levels adapted selectively to receive one edge of said foot rest panel.

18. The article of furniture according to claim 16 further including vertical end members connected to opposite ends of said seat panel, and a back panel adapted to be positioned generally vertically and selectively at a plurality of different distances from said forward edge of said seat panel and at different positions spaced vertically above said seat, said greater vertical spacing being in accordance with the back panel being positioned greater distances from said forward edge of said seat.

19. The article of furniture according to claim 18 in which said vertical end members on said seat each have a pattern of a similar plurality of substantially vertical slots respectively disposed at spaced intervals extending inwardly from one side edge of said end members and the lower ends of said slots being spaced progressively greater distances above said seat in the slots farthest from said one edge of said seat to accommodate said back panel comfortably to persons of different sizes.

20. The article of furniture according to claim 18 further including a plurality of parallel horizontal slots in said vertical end members at different levels above said seat panel, and a tray panel adjustably positionable in said slots to dispose the same adjustably above said seat.

21. An article of furniture of the swinging type comprising in combination, a base frame comprising a pair

of head members extending vertically upward from a horizontal connecting member to maintain the same firmly in spaced parallel relationship, a pair of similar substantially U-shaped suspension members pivotally connected at the ends of the legs thereof to the upper portions of said head members adjacent opposite edges thereof and having horizontal terminal extensions thereon, bearings in said head members receiving said horizontal terminal extensions and said suspension members depending from said bearings, interengaging latching members on said terminal extensions and bearings operable when said article of furniture is in normal upright operating position to prevent removal of said extensions from said bearings but said latching members being disengageable when said article of furniture is moved substantially from said normal upright position, and a body supporting unit mounted upon the lower horizontal portions of said suspension members.

22. The article of furniture according to claim 21 in which at least one of the interengaging latching members on each extension and bearing comprises a slidable latch element normally maintained in operative position by gravity.

23. The article of furniture according to claim 21 in which said interengaging latching members comprise notches formed in said horizontal extensions on the legs of said suspension members and latch members slidable by gravity between unlatched positions for engagement with walls of said notches.

24. The article of furniture according to claim 23 in which the ends of said horizontal terminal extensions have cam surfaces engageable with said latch members when disposing said extensions within the bearings in

said head members and thereby remove said latch members to unlatched position followed by said latching members moving by gravity to latched position to secure said extensions operatively within said bearings.

25. The article of furniture according to claim 22 in which said terminal extensions have cam surfaces thereon operable to engage said latching members during the positioning movements of said extensions within said bearings and thereby cammingly move said latching members to unobstructing positions until said extensions have been operatively received within said bearings, whereupon gravity effects movement of said latching members into operative latching positions relative to said extensions.

26. The article of furniture according to claim 1 in which said horizontal lower portions of said torsion members adjacent the opposite ends thereof are provided with bearings adapted to engage means on the lower portions of said supporting unit, positioning means on said lower portions of said torsion members engaging said bearings and preventing movement thereof toward each other, upper bearings carried by the upper portion of said head members to receive said ends of said legs of said U-shaped torsion suspension members, and means on said ends of said legs abutting said upper bearings and urging the same inwardly relative to said head members, whereby the torsion forces in said legs of said torsion members urge said bearings in said head members in opposite axial directions relative to said bearings on said lower portions of said torsion members.

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