Dec. 7, 1943. G. H. HAMILTON 2,336,013

CHAIR

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Fig. 1

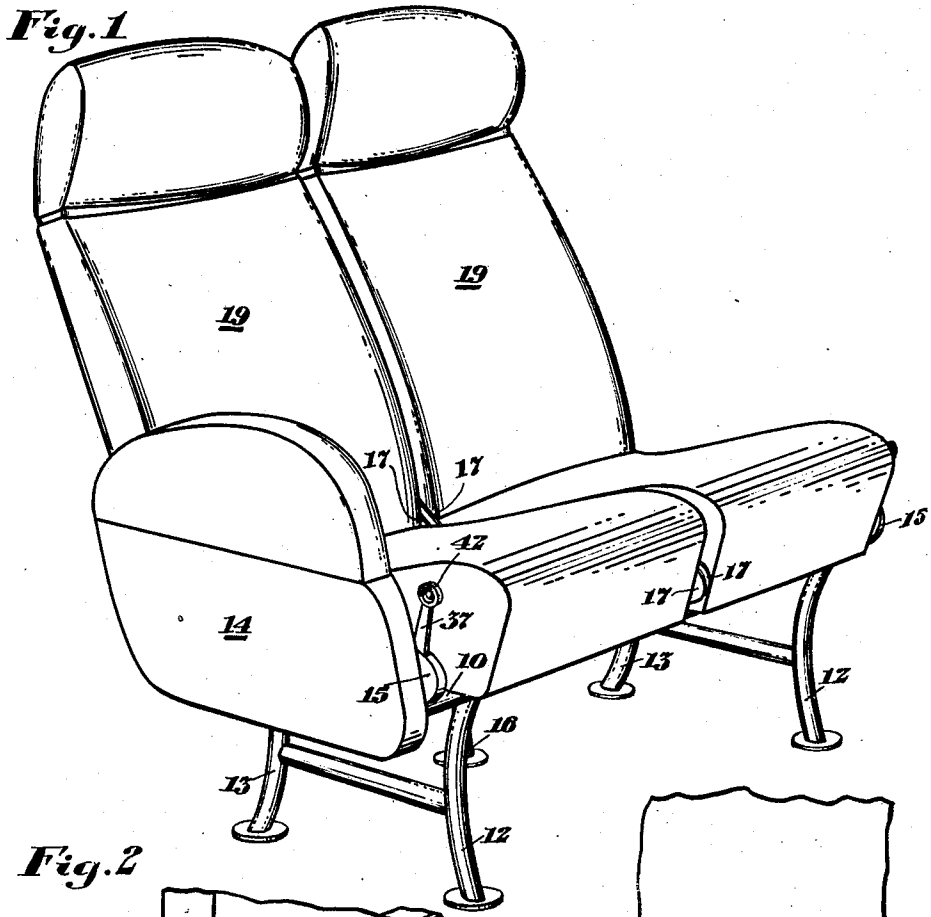
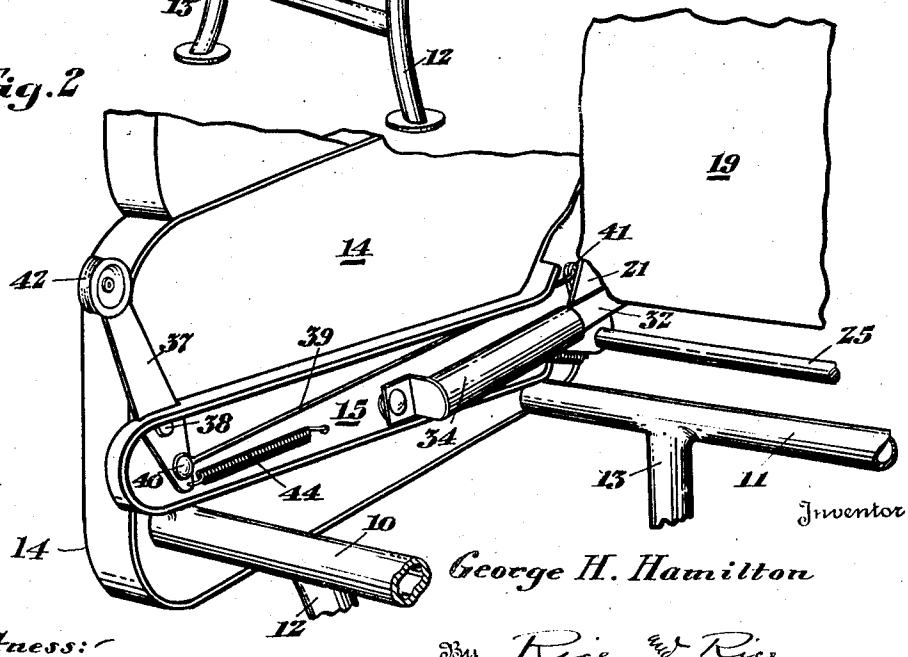


Fig. 2



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Fig. 3

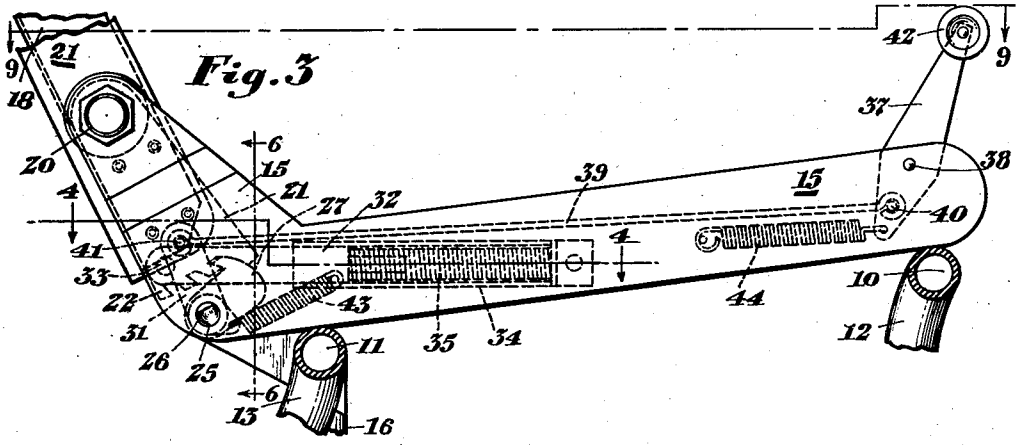


Fig. 8

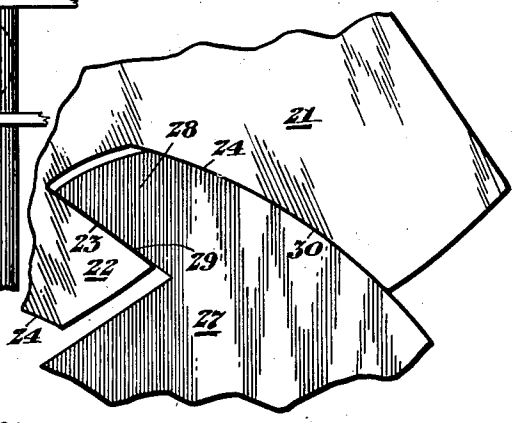


Fig. 5

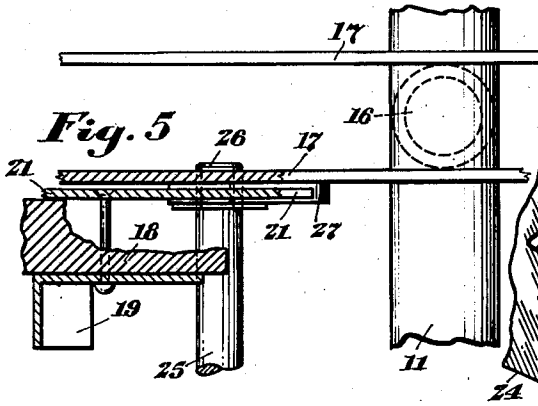
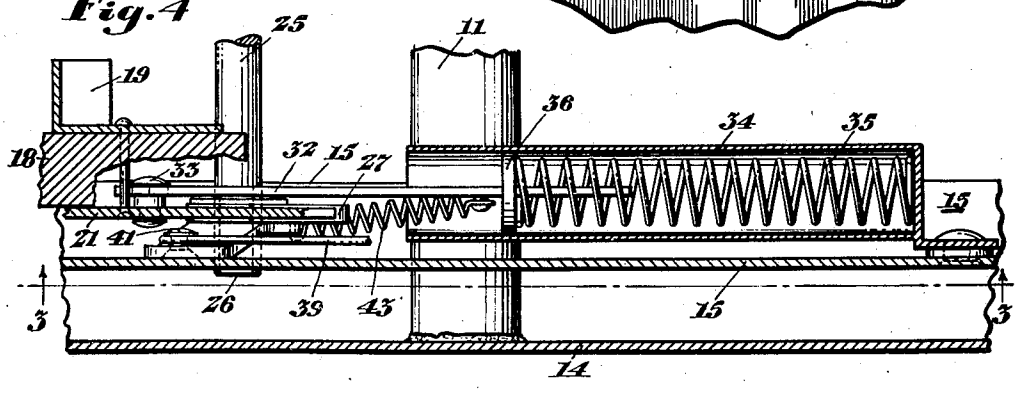


Fig. 4



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Fig. 6

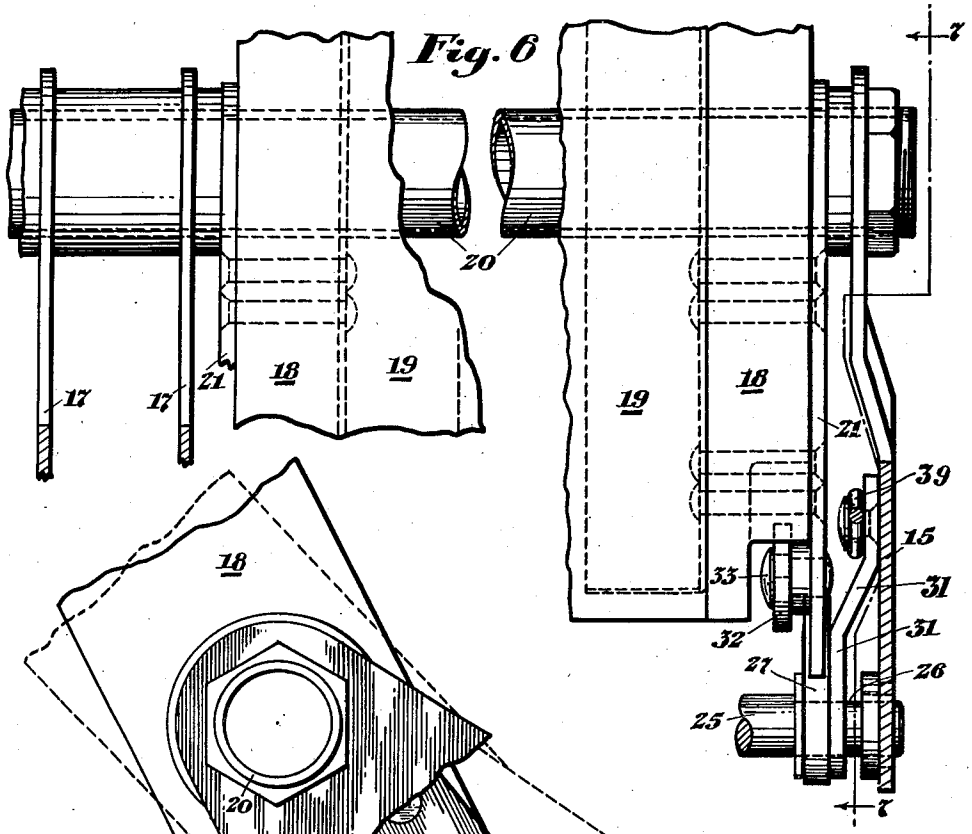
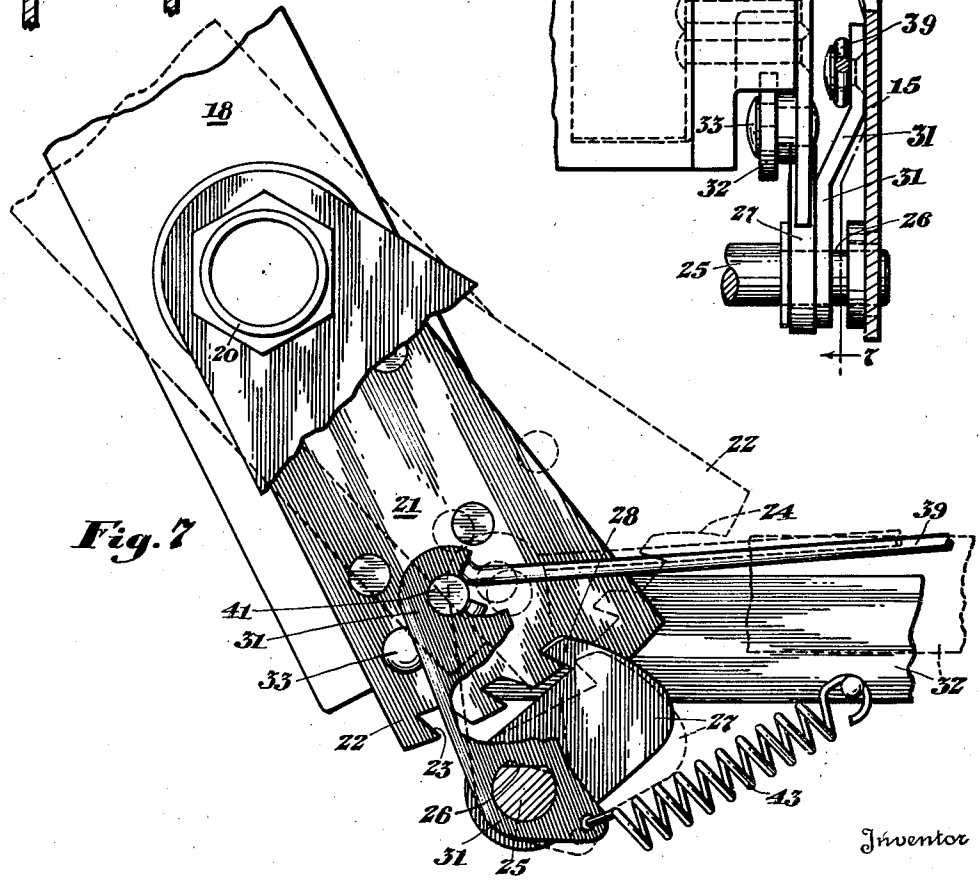


Fig. 7



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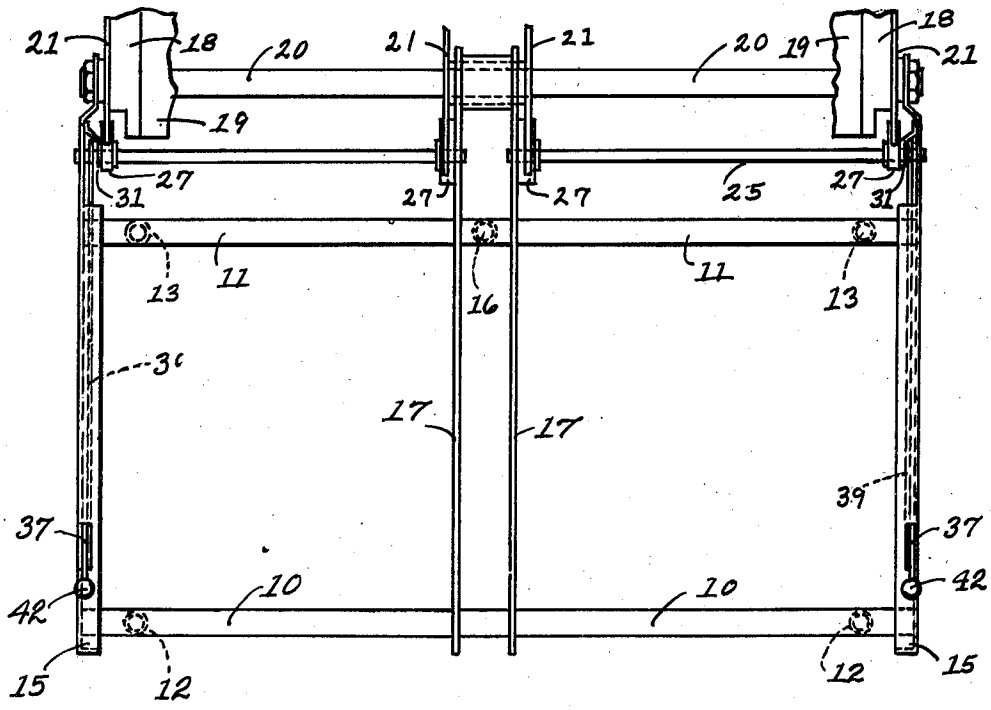


FIG. 9

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Patented Dec. 7, 1943 2,336,013

UNITED STATES PATENT OFFICE

2,336,013

CHAIR

George H. Hamilton, Grand Rapids, Mich., assignor to American Seating Company, Grand Rapids, Mich., a corporation of New Jersey

Application March 7, 1940, Serial No. 322,669

4 Claims. (Cl. 155—161)

The present invention relates to chairs and more particularly to a chair having a reclining back. The chair herein shown and described is in the nature of a modification of the chair structure shown and described in the pending applications for patents, Serial Nos. 253,063 and 254,357, now Patent Number 2,310,476, issued February 9, 1943, respectively filed January 27, 1939, and February 3, 1939, by Edwin T. Todd and by him assigned to my assignee.

The primary objects of the instant invention are to provide a chair of the general character above indicated having means for adjustably fixing the back thereof at a selected angular inclination; to provide such a chair whose angularly adjustable back is normally caused to be tilted rearwardly to selective angular disposition by an occupant thereof; to provide such a chair having means for positively maintaining the back in angularly adjusted position from which maintained position the back may nevertheless be readily shifted to a different selectively adjusted angular disposition; to provide such a chair which is particularly well adaptable for installation in motor busses, railway coaches and airplanes; to provide such a chair whose operating mechanism is simple and compact, hidden from view and efficient in operation; and, to provide such a chair which is attractive in appearance, light in weight yet rugged in construction, comfortable in use and reasonably economical in manufacture.

An illustrative embodiment of the invention is shown in the accompanying drawings, wherein—

Figure 1 is a front perspective view of a pair of chairs whose respective backs are each independently angularly adjustable;

Figure 2 is an enlarged fragmentary perspective view of a portion of the chair frame and its back and showing certain parts of the operating mechanism for controlling the adjusted angular inclination of the back;

Figure 3 is a sectional view of a portion of the frame and the chair back operating mechanism on line 3—3 of Figure 4;

Figure 4 is a sectional view thereof on line 4—4 of Figure 3;

Figure 5 is a fragmentary top plan view of a portion of the rear side of the chair frame and of the chair back operating mechanism, certain parts being shown in section;

Figure 6 is a fragmentary front elevational view of a portion of the chair frame and a portion of the chair back operating mechanism;

Figure 7 is a sectional view thereof on line 7—7 of Figure 6;

Figure 8 is an enlarged side elevational view of a portion of the operating mechanism by which the back is maintained in selective angular inclination; and

Figure 9 is a fragmentary plan view of a portion of the chair frame structure.

Referring then to the drawings wherein like parts of the structure shown are designated by the same numerals in the several views, a frame for a pair of chairs disposed side by side and of a character particularly well adapted for installation in motor busses, railway coaches or airplanes, comprises a pair of spaced horizontally disposed frame supporting members 10, 11, here shown as formed from tubular stock to provide for rigidity with light weight, respectively supported above the floor and adjacent their opposite ends by front legs 12 and rear legs 13 which are likewise of tubular construction.

An arm support 14, here shown as of stamped sheet metal, is disposed on the outside or aisle end of the frame members 10, 11 to whose outer ends the arm support is secured in any suitable manner and an open faced stamped sheet metal housing 15 for the chair back operating mechanism, turned angularly upwardly at its rear end, and is spot welded or otherwise secured to the upper sides of both opposite ends of the frame members 10, 11.

An intermediate rear leg 16, likewise formed of tubular stock, supports the rear tubular frame member 11 medial of its length and a pair of spaced angularly-upwardly extending brackets 17 are disposed on and secured to opposite sides of the intermediate rear leg 16 below the rear frame member 11, all as best shown in Figures 5 and 9.

A pair of spaced upwardly angularly disposed chair back supporting members 18 for each chair back 19 are pivotally mounted on a stationary shaft 20 which is secured adjacent its opposite ends between the rear upwardly-angularly extending portions of the open faced housings 15 and which is fixedly supported intermediate its length by the two spaced brackets 17 through which it projects as best shown in Figures 3, 6 and 7, to permit an independent forward and rearward tilting movement of each chair back 19.

Secured to each chair back supporting member 18 adjacent the outer surface thereof is a rack plate 21 whose lower end projects below the back supporting member 18 to which it is secured and which lower end is provided with a series of teeth 22 which teeth each have one linear detent en-

gaging face 23 and one arcuate detent engaging face 24 as best shown in Figures 7 and 8.

Horizontally disposed rotatable shafts 25 are each journalled at their inner ends within a bearing in one of the brackets 17 and at their outer ends within a bearing in one of the open faced housings 15, the opposite ends of both shafts 25 each having a short longitudinal flattened portion 26 as best shown in Figures 6 and 7. A detent plate 27 embraces each flattened end of each rotatable shaft 25 and each is provided with an upwardly extending tooth 28 having a rearward linear face 29 and a forward arcuate face 30 respectively adapted for selective engagement with the linear and arcuate faces 23, 24 of the teeth 22 on the rack plate 21 as best seen in Figures 6, 7 and 8.

Means is provided for urging a directional tilting of the back supporting members 18 and toward this end shaft rotating plates 31 embrace the outer recessed ends of each rotatable shaft 25 outside each detent plate 27 as best shown in Figures 6 and 7 and a link 32 pivotally secured at its rear end to a stud 33 on each rack plate 21, projects into the open end of a tubular cylinder 34 housing a coiled expansion spring 35 whose forward end abuts the closed end of the cylinder and whose rearward end abuts a disc 36 fixedly embracing the forward end of the link 32. The spring 35, acting through the link 32 and stud 33, normally urges the lower end of the rack plate 21 rearwardly, thus to a certain extent counterbalancing the normal unstable equilibrium of the chair back when the rack plate 21 is disengaged by the detent plate 27 and thereby facilitating normal forward tilting of the chair back.

Although the tooth of the detent plate 27 is thus normally maintained in selected and wedged tooth engagement with one of the teeth of its rack plate 21 as shown in full lines in Figure 7 and because of the contour of the engaging teeth, means are provided for manually effecting such disengagement in instances wherein the occupant of the chair desires to tilt the back thereof to a different selected angular disposition. Means for effecting such disengagement comprise the lever plate 37 pivotally secured to the housing 15 by means of the pivot pin 38. A rod 39 which is pivotally secured at its forward end to the lower end of the lever plate 37 by means of the stud 40 is secured at its rearward end to the upper end of the shaft rotating plate 31 through the stud 41.

It will thus be seen that manual operation of the lever plate 37 by its handle 42 rearwardly or toward the occupant of the chair effects rotation of the shaft 25 to release the tooth of the detent plate 27 from engagement with one of the teeth of the rack plate 21 and against the action of the two coiled contraction springs 43, 44 which normally urge the detent plate tooth into engagement with a tooth of the rack plate.

It is to be noted that by virtue of the arcuate shape of the forward edge of the tooth 28 of the detent plate 27 and of the teeth 22 which are selectively engaged thereby, manual shifting or tilting of the chair back forwardly may be accomplished by a ratchet-like action without operating the detent plate 27. However, normal shifting of the chair back in the opposite direction is positively prevented due to the linear form of the teeth 28 and 22.

It will thus be seen that the chair structure herein shown and described is well adaptable for installation in motor busses, railway coaches and airplanes and that the chair is attractive in appearance, light in weight yet rugged in construction and is comfortable in use and reasonably economical in manufacture.

While but one specific embodiment of the invention has been herein shown and described, it will be understood that certain details of the construction shown may be altered or omitted without departing from the spirit of the invention as the same is defined by the following claims.

I claim:

1. A chair frame having a pivotally mounted back support, a rack plate mounted on the back support having a plurality of teeth each having on one edge one linear detent engaging face and on its opposite edge one arcuate detent engaging face, a detent plate pivotally mounted on the chair frame and having a tooth with a linear tooth engaging face on one edge and an arcuate tooth engaging face on its opposite edge and in selective and detachable meshing engagement with the teeth of the rack plate for controlling a selectively adjustable angular inclination of the back support, means normally urging engagement of the tooth of the detent plate into unidirectional locking engagement between teeth of the rack plate with their curved and linear faces respectively in engagement, so that the back support is positively held against rearward tilting movement by the mutual engagement of said linear faces and yieldingly held against forward tilting movement by the mutual engagement of said arcuate faces without releasing said detent plate, and means operating independently of the urged detent plate urging a forward directional tilting movement of the back support.

2. A chair frame having a pivotally mounted back support, a rack plate mounted on the back support having a plurality of teeth each having on one edge one linear detent engaging face and on its opposite edge one arcuate detent engaging face, a detent plate pivotally mounted on the chair frame and having a tooth with a linear tooth engaging face on one edge and an arcuate tooth engaging face on its opposite edge and in selective detachable meshing engagement with the teeth of the rack plate for controlling a selectively adjustable angular inclination of the back support, means normally urging engagement of the tooth of the detent plate into engagement between teeth of the rack plate with their curved and linear faces respectively in engagement so that the back support is positively held against rearward tilting movement by the mutual engagement of said linear faces and yieldingly held against forward tilting movement by the mutual engagement of said arcuate faces without releasing said detent plate, means for releasing the normally engaged detent plate from its rack plate, and means operating independently of the urged detent plate urging a forward tilting movement of the back support comprising a coiled expansion spring whose one end abuts the closed end of a tubular cylinder mounted on the chair frame and whose other end abuts a link which extends out of the cylinder and is pivotally connected with the back support.

3. A chair frame having a pivotally mounted back support, a rack plate mounted on the back support having a plurality of teeth each having on one edge one linear detent engaging face and on its opposite edge one arcuate detent engaging face, a detent plate pivotally mounted on the chair frame and having a tooth with a linear tooth engaging face on one edge and on its op-

posite edge an arcuate tooth engaging face and in selective detachable meshing engagement with the teeth of the rack plate for controlling a selectively adjustable angular inclination of the back support, means normally urging engagement of the tooth of the detent plate into unidirectional locking engagement between teeth of the rack plate with their curved and linear faces respectively in engagement, so that the back support is positively held against rearward tilting movement by the mutual engagement of said linear faces and yieldingly held against forward tilting movement by the mutual engagement of said arcuate faces without releasing said detent plate, means operating independently of the urged detent plate urging a forward tilting movement of the back support comprising a tubular cylinder having a closed end mounted on the chair frame, a compression spring disposed in said cylinder and having one end abutting said closed end of the cylinder, and a link connecting the other end of the spring and the back support.

4. A chair structure comprising, in combination: a frame; a back support pivotally mounted thereon for forwardly-rearwardly tilting movement and having a rack whose teeth have arcuate rearward detent-engaging faces and opposite linear forward detent-engaging faces; and a releasable spring pressed detent pivotally mounted on the frame for normal movement relatively to the rack and having an arcuate forward face and a linear rearward face engaging the arcuate rearward face and the linear forward face of a pair of the rack's teeth in the operative engagement of the detent therewith for holding the back support positively against rearward tilting movement and yieldingly against forward tilting movement.

GEORGE H. HAMILTON.