July 17, 1951 J. M. DORTON 2,560,688

ADJUSTABLE CHAIR

Filed Feb. 8, 1946 2 Sheets-Sheet 1

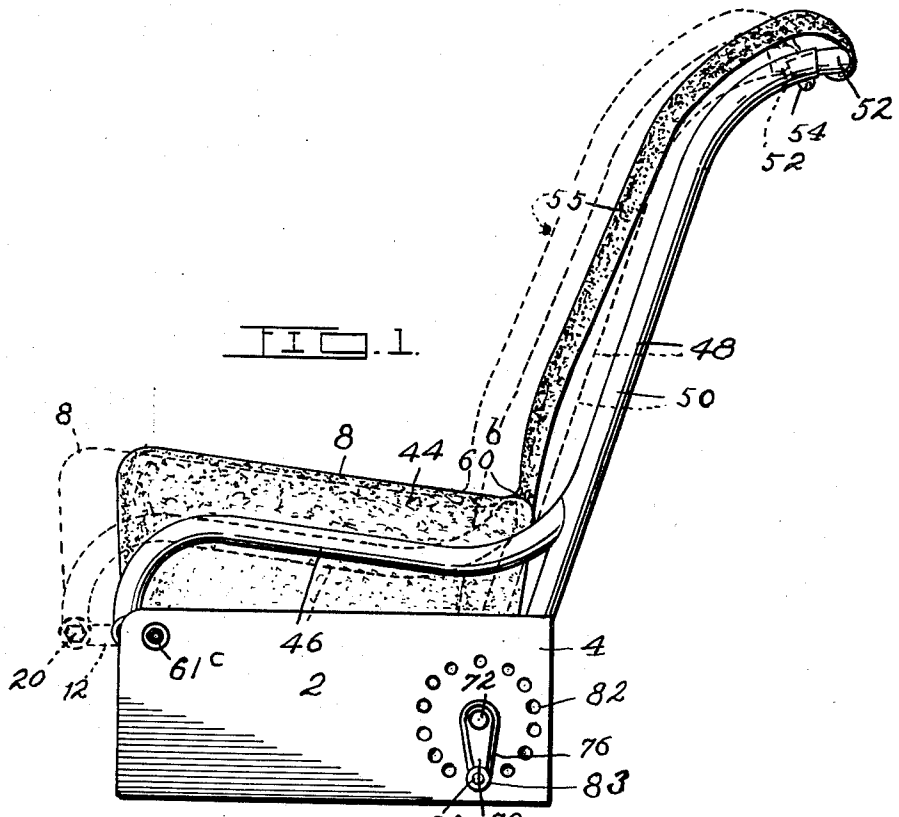


FIG. 1.

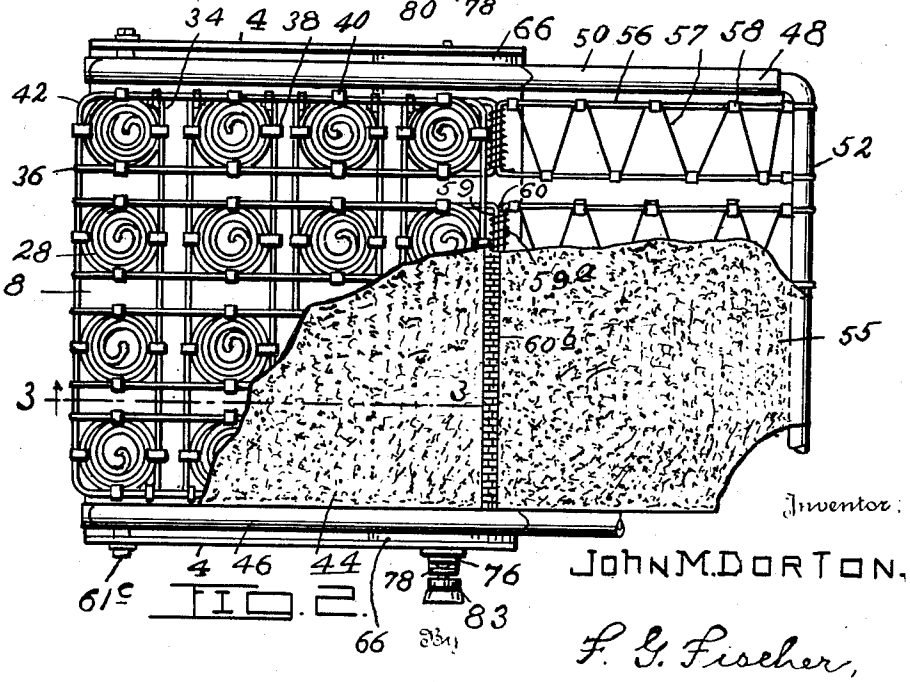


FIG. 2.

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ADJUSTABLE CHAIR

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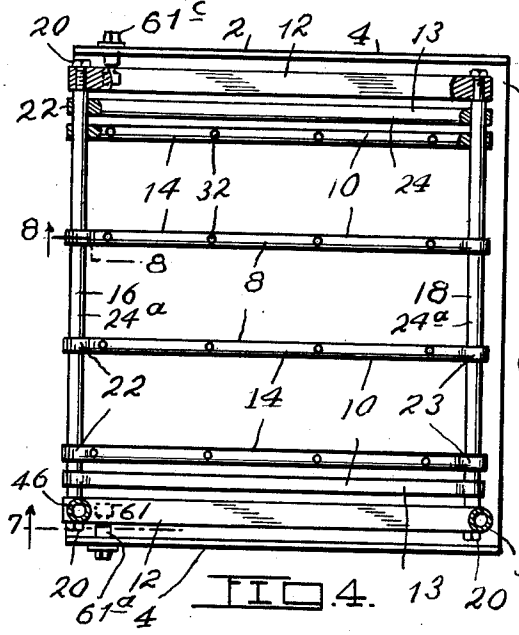


FIG. 4.

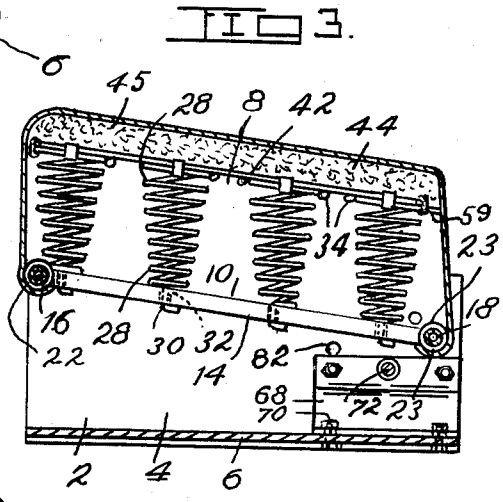


FIG. 3.

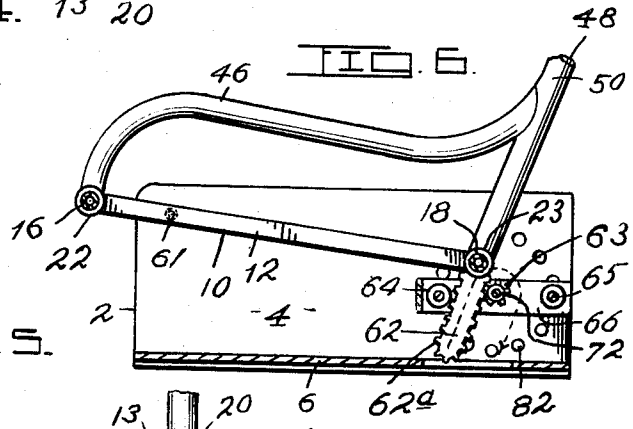


FIG. 6.

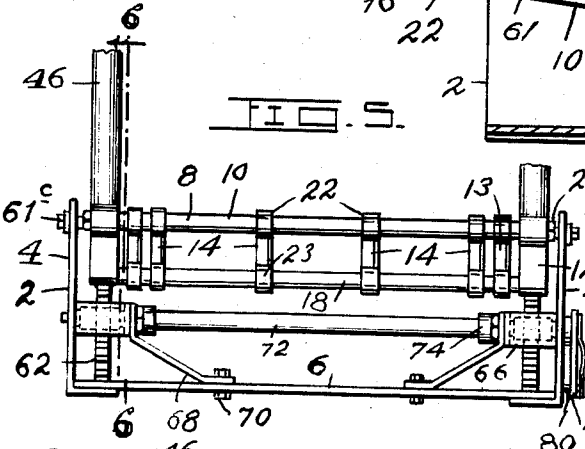


FIG. 5.

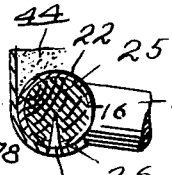


FIG. 8.

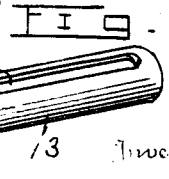


FIG. 9.

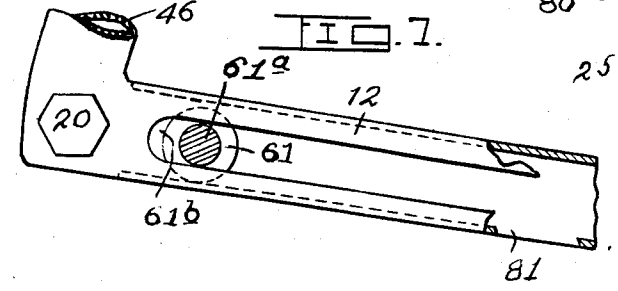


FIG. 7.

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Patented July 17, 1951

2,560,688

UNITED STATES PATENT OFFICE

2,560,688

ADJUSTABLE CHAIR

John M. Dorton, Bonner Springs, Kans.

Application February 8, 1946, Serial No. 646,357

5 Claims. (Cl. 155—14)

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My invention relates to adjustable seat and back structures which may be employed to advantage in passenger vehicles, such, for example as automotive vehicles, railway cars, and airplanes. The seat and back structures may also be incorporated in various kinds of furniture or wherever seat and back structures of this character are desired.

One object of the invention resides in the provision of seat and back structures in which the component parts can be quickly assembled or taken apart for repairs, storage, or shipment in knockdown form, so that they will occupy only a minimum of space.

Another object is to provide seat and back structures which may be adjusted forward or backward, or upward or downward, thereby rendering said seat and back structures especially desirable for use in passenger vehicles as they can be adjusted to different positions to suit the convenience of the passengers.

A further object is to provide cushioning means for the seat structure including a plurality of helical springs having downturned terminals which can be quickly assembled with associated parts of the seat structure having spaced perforations for reception of said downturned terminals.

Other objects will hereinafter appear and in order that the invention may be fully understood, reference will now be had to the accompanying drawings, in which:

Fig. 1 is a side elevation of the seat and back structures shown in normal position in solid lines and adjusted forwardly in dotted lines.

Fig. 2 is a top plan view of the seat and back structures with portions of the upholstery and back structure broken away.

Fig. 3 is a longitudinal sectional view of the seat structure taken on line 3—3 of Fig. 2, with the addition of all the seat upholstery.

Fig. 4 is a top plan view of the frame-work of the seat structure.

Fig. 5 is a front elevation of the seat frame and a portion of the arms.

Fig. 6 is a vertical sectional view on line 6—6 of Fig. 5.

Fig. 7 is an enlarged fragmentary sectional view on line 7 of Fig. 4.

Fig. 8 is an enlarged cross section on line 8—8 of Fig. 4, with the addition of a part of the upholstery.

Fig. 9 is an inverted fragmentary view of one of a number of composite members employed in the seat structure.

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Referring in detail to the different parts, 2 designates a base for the seat structure which may rest upon a supporting surface, not shown, such for example as the floor of a passenger vehicle, or legs when used as a household article of furniture, or upon a swivel support similar to that used for desk chairs. The base structure 2, which preferably consists of sheet metal, comprises two spaced side walls 4 and a bottom 6, which latter unites the lower portions of the former, thereby making the base of substantially U-formation.

A seat structure 8 is adjustably mounted in the base structure 2 for forward, backward, upward, or downward movement, and includes a lower frame 10, comprising a pair of side bars 12, a pair of rods 13, adjacent to the bars 12, a plurality of spaced rods 14 arranged between and paralleling the rods 13, and front and rear members 16 and 18, respectively.

The side bars 12 are removably connected to the ends of the front and rear members 16 and 18 by any appropriate means, such, for example, as screws 20, and the rods 13 and 14 are removably connected to said front and rear members 16 and 18 by annular terminals 22 and 23 integral with the front and rear ends of the rods 13 and 14, respectively. By removably connecting the different parts of the lower frame 10, as above stated, it can be readily assembled or taken apart for shipment, repairs or storage. The two side rods 13 and the front and rear members 16 and 18 are of composite construction comprising metal sheaths 24 enclosing wood or other suitable tacking strips 25. The sheaths have longitudinal slots 26, through which tacks 27 may be driven to secure the lower side and front margins of upholstery hereinafter referred to, to said tacking strips.

The seat structure 8 is internally cushioned by a group of equally spaced helical springs 28 spaced upon the intermediate rods 14. The springs 28 taper downwardly and have downturned lower terminals 30 which extend freely through equally spaced perforations 32 in the rods 14 and are then bent laterally, Fig. 3, to hold them in place. The upper ends of the springs 28 are held in spaced relation to each other by transverse and longitudinal cables 34 and 36 which are secured to the upper coils of the springs 28 by means of clips 38 and 40, respectively. The cables 34 and 36 are also connected by the clips 40 to a circumferential cable 42, which extends completely around the upper portion of the group of springs 28, as shown by Fig. 2. The seat structure is covered with upholstery 44 which has pad-

ding 45, Fig. 3, covering the upper ends of the springs 28 to provide a comfortable seat.

The side bars 12 are provided with arms 46 and an upwardly extending back frame 48. The forward ends of the arms 46 are curved downwardly and fixed to the front ends of the side bars 12, and the rear ends of the arms 46 are fixed to opposite side bars 50 forming part of the back frame 48. The side bars 50 are united at their upper ends by a transverse bar 52, the ends of which latter are turned forwardly and removably secured in the upper tubular ends of the side bars 50 by screws 54, so that the back frame with the arms 46 may be taken apart for shipment or repairs.

The back frame 48 has a plurality of longitudinal cables 56 and zigzag cables 57, which latter are connected to the former by clips 58. The back frame is provided with upholstery 55. The rear ends of the seat cables 36 are united in pairs by transverse hinge members 59 and the lower ends of the back cables 56 are united in pairs by transverse hinge members 60, which latter are detachably connected to the former by spiral hinge members 59*a*, as shown by Fig. 2. The back frame upholstery 55 is detachably connected at its lower end by a zipper 60*b* to the rear portion of the seat frame upholstery 44, so that the seat and back frames may be readily detached for shipment or repairs. The transverse bar 52 of the seat back is of composite form similar to the composite rods 13, and the front and rear members 16 and 18, respectively, of the lower seat frame 10, so that the upper end of the back frame upholstery 55 may be tacked thereto.

The side bars 12 of the seat structure are of tubular formation to receive antifriction rollers 61, Fig. 7, mounted upon stub shafts 61*a*, which latter extend through longitudinal slots 61*b* in the side bars 12, and are secured to the side walls 4 of base 2 by suitable means such as nuts 61*c*. The side bars 50 of the back frame 48 extend downward below the seat structure 8, Figs. 5 and 6, and are provided with racks 62, each of which has a series of front, rear and lower end rack teeth 62*a*. The teeth 62*a* of both racks 62 are adapted to intermesh with respective pinions 63, each of which is located midway between a pair of antifriction guide rollers 64 mounted upon stub shafts 65 secured in a bracket 66. The rollers 64 retain the racks in mesh with the pinions when moving upward or downward. The brackets 66 are secured to the side walls 4 of the base 2 and reinforced by braces 68 extending downward at an angle to the bottom wall 6 of the base to which they are suitably secured as by bolts 70.

The pinions 63 are mounted upon a rotatable shaft 72, journaled in bearings 74 fixed to the brackets 66. The ends of the shaft 72 extend through apertures in the side walls 4 of the base 2 and either one is adapted to receive a crank 76 whereby the shaft 72 may be manually rotated and in turn rotate the pinions 63 to adjust the racks 62 to the desired position. After the racks 62 have been adjusted the crank 76 is secured from accidental movement by a spring latch 78 secured at one end to the crank 76 and provided at its opposite end with a pin 80 adapted to enter any one of a circular series of perforations 82 in each side wall 4. A knob 83 is provided to rotate the shaft 72 and withdraw the pin 80 from any perforation 82, when desired. The centers of the respective circular

series of perforations 82 are coincidental with the longitudinal axis of the shaft 72.

From the foregoing description it is apparent that when the seat and back structures are in the forward position disclosed by dotted lines, Fig. 1, and full lines Fig. 6, they may be adjusted backward by rotating the pinions 63 to cause the racks 62 to travel upward over the pinions 63 and then backward and downward as indicated by the arrow, Fig. 6. It is also apparent that the seat and back structures may be adjusted upwardly or downwardly by moving the racks to the top of the pinions 63 or moving them downwardly to the position disclosed by Fig. 6.

The seat and back structures are made removable from the base structure 2 by providing apertures 81 in the undersides of the bars 12. By adjusting the rear portion of the seat and back structure upward until the racks 62 are at the top of the pinions 63 the seat and back structures may be moved forward until the apertures 81 register with the rollers 61. The seat and back structures, together with the bars 12, may then be lifted to clear the rollers. The apertures 81 are placed a sufficient distance to the rear of the front ends of the bars 12 to prevent the apertures from registering with the rollers 61 when the seat and back structures are moved forward by the racks and pinions 62 and 63, respectively.

By removably connecting the different parts of the chair as hereinbefore described it is apparent that said parts can be readily assembled or taken apart for repairs, storage, or shipment in compact form.

While it is apparent that I have provided an adjustable chair possessing the advantages above pointed out, and have shown and described a preferred form of the seat and back structures I reserve all rights to such changes and modifications thereof as properly fall within the scope of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. An adjustable chair structure comprising a base, a seat structure, means connecting the forward portion of said seat structure to said base for pivotal movement on a horizontal axis transverse to the chair and for forward and rearward sliding movement, a rack fixed to said seat structure at the rearward edge thereof and extending downwardly therefrom, said rack having teeth formed continuously along the forward and rearward edges thereof and around the lower end thereof, a pinion carried rotatably by said base and meshing with said rack, and means for turning said pinion.

2. An adjustable chair structure comprising a base, a seat structure, means connecting the forward portion of said seat structure to said base for pivotal movement on a horizontal axis transverse to the chair and for forward and rearward sliding movement, a rack fixed to said seat structure at the rearward edge thereof and extending downwardly therefrom, said rack having teeth formed continuously along the forward and rearward edges thereof and around the lower end thereof, a pinion carried rotatably by said base and meshing with said rack, means for turning said pinion in either direction, and rollers carried by said base and adapted to maintain said rack in engagement with said pinion.

3. An adjustable chair structure comprising a base, a seat structure, means connecting the forward portion of said seat structure to said base

for pivotal movement on a horizontal axis transverse to the chair and for forward and rearward sliding movement, a rack fixed to said seat structure at the rearward edge thereof and extending downwardly therefrom, said rack having teeth formed continuously along the forward and rearward edges thereof and around the lower end thereof, a pinion carried rotatably by said base and meshing with said rack, and means for turning said pinion adjustably in either direction, and means for securing said pinion against accidental rotation.

4. An adjustable chair structure comprising a base, a seat structure including a pair of tubular side bars extending generally horizontally from front to rear of the chair, each of said side bars having a longitudinal slot formed therein adjacent the forward end thereof, a pair of axles fixed to said base and extending respectively into said side bars through said slots, said axles being coaxial and disposed horizontally transverse to the chair a roller carried for rotation on each of said axles and supporting said side bars, a plurality of racks fixed to said seat structure at the rearward edge thereof and extending downwardly therefrom, said rack having teeth formed continuously along the forward and rearward edges thereof and around the lower end thereof, a plurality of pinions carried rotatably by said base and respectively meshing with said racks, and means for turning said pinions.

5. An adjustable chair structure comprising a base, a seat structure, means connecting the forward portion of said seat structure to said base for pivotal movement on a horizontal axis transverse to the chair and for forward and rearward sliding movement, a rack fixed to said seat structure at the rearward edge thereof and extending downwardly therefrom, said rack having teeth

formed continuously along the forward and rearward adges thereof and around the lower end thereof, a shaft carried for rotation by said base parallel to the pivotal axis of said seat structure, a pinion fixed on said shaft and meshing with said rack, a crank for turning said shaft, and a detent pin carried by said crank and adapted to engage selectively one of a plurality of holes formed therefor in said base, whereby said shaft is secured against accidental rotation.

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