

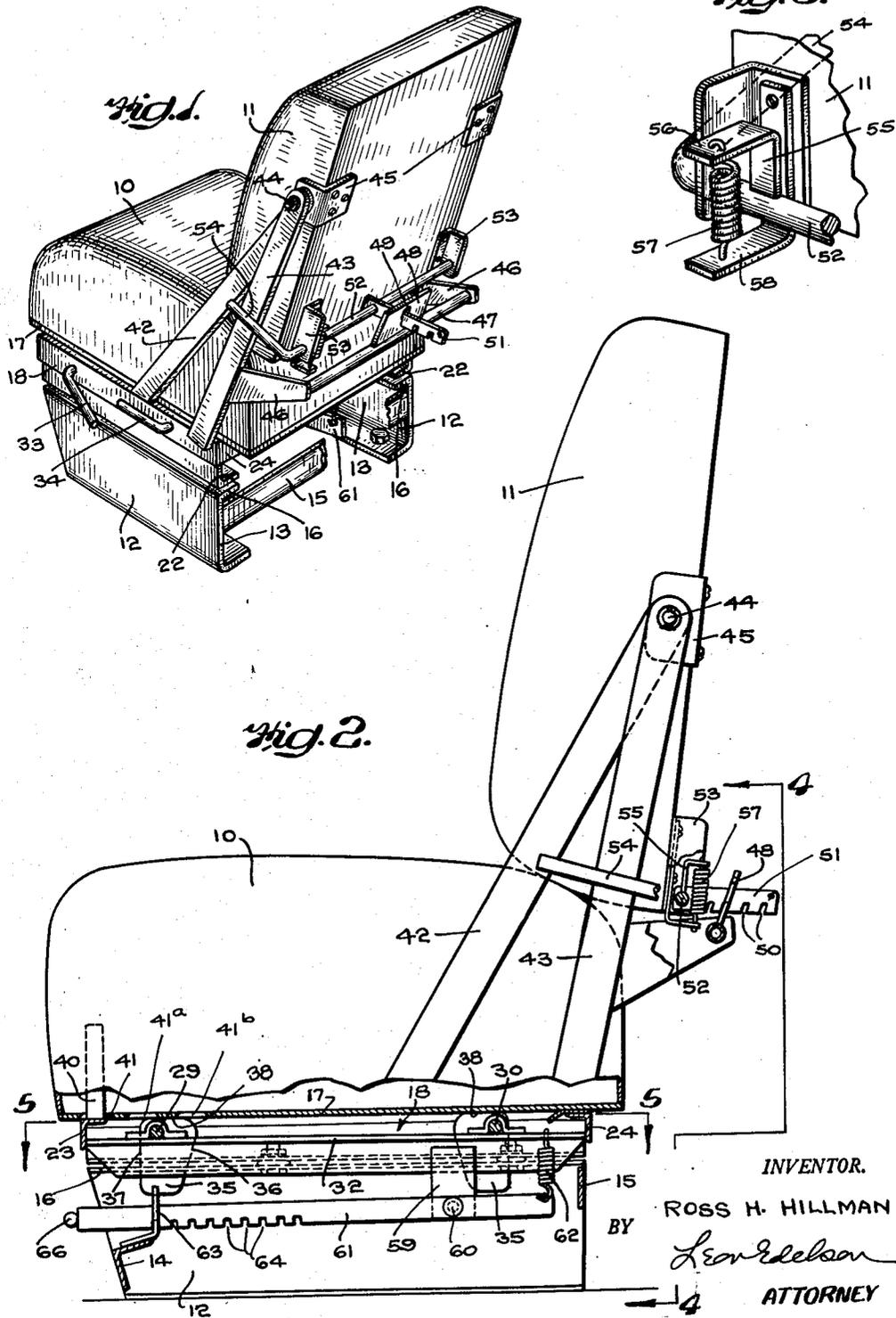
July 28, 1953

R. H. HILLMAN  
ADJUSTABLE SEAT STRUCTURE

2,646,839

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4 Sheets-Sheet 1



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Fig. 4.

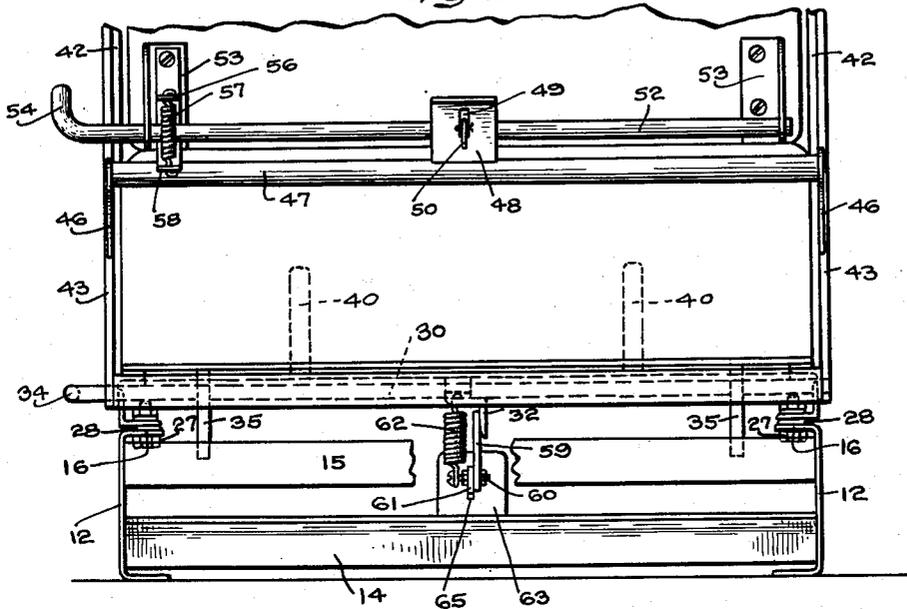


Fig. 5.

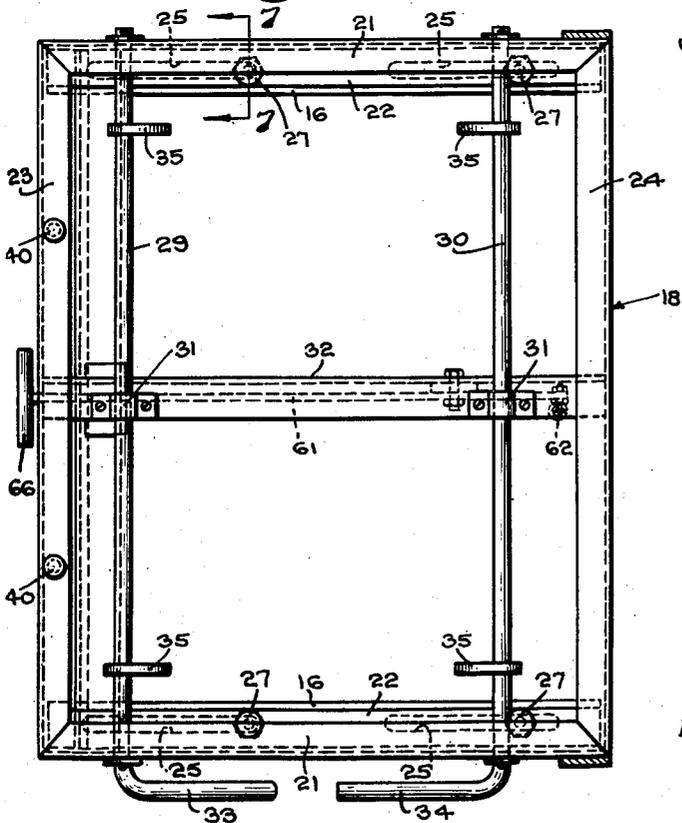


Fig. 6.

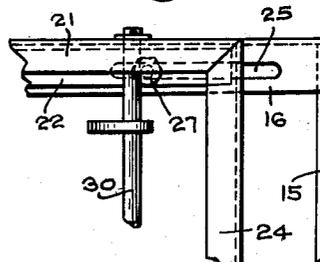
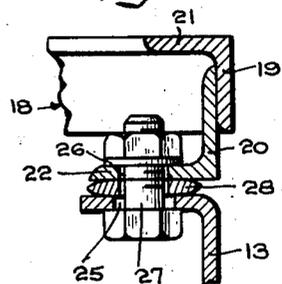


Fig. 7.



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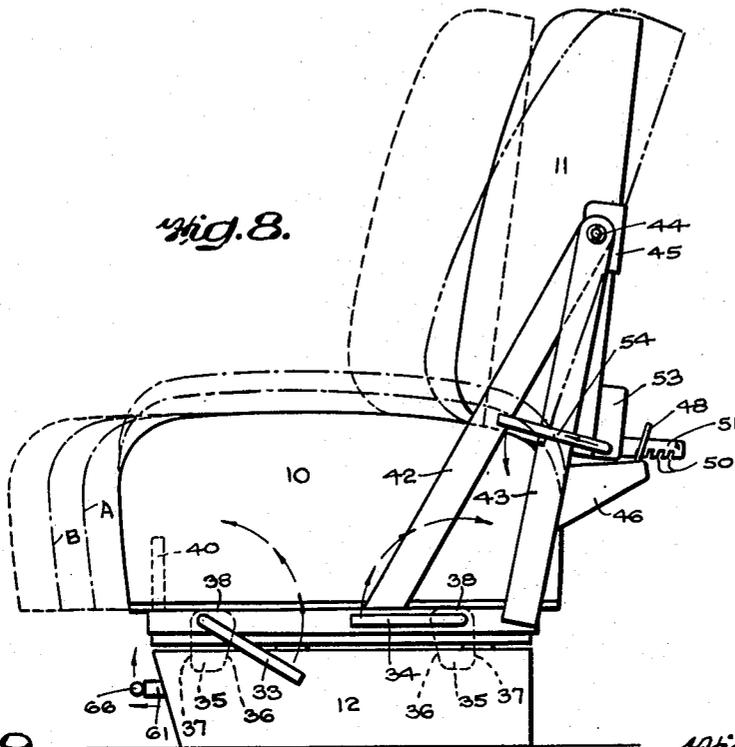


Fig. 8.

Fig. 9.

Fig. 10.

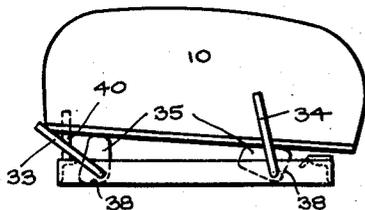


Fig. 11.

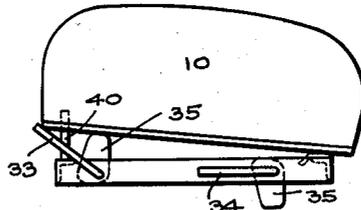
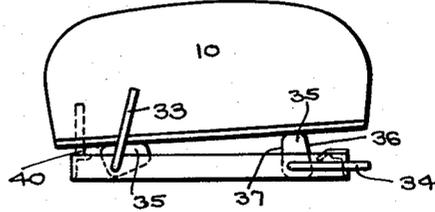
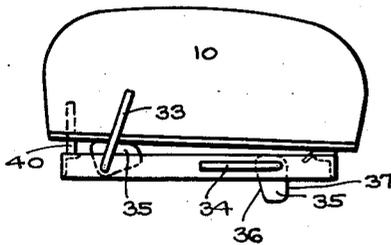


Fig. 12.



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Fig. 13.

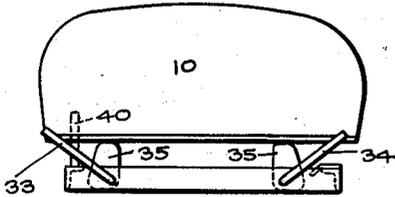


Fig. 14.

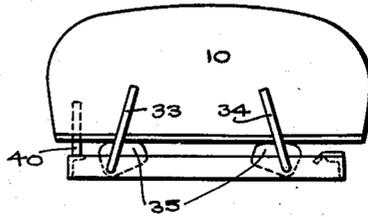


Fig. 15.

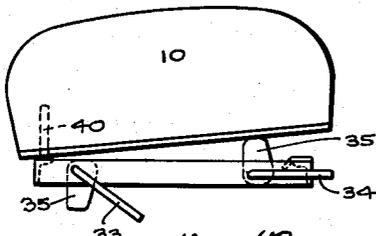


Fig. 16.

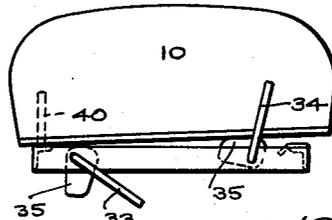


Fig. 17.

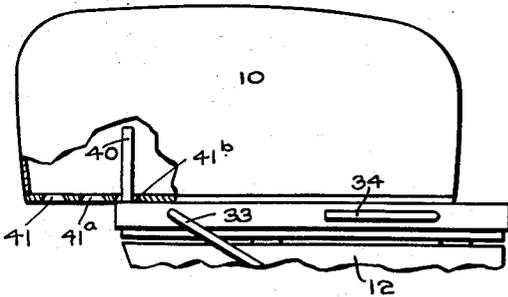


Fig. 18.

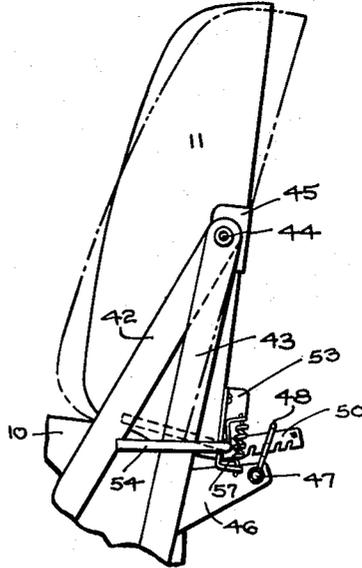
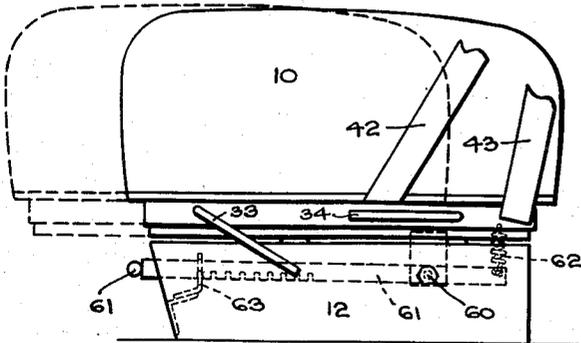


Fig. 19.



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# UNITED STATES PATENT OFFICE

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## ADJUSTABLE SEAT STRUCTURE

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Application August 6, 1948, Serial No. 42,771

10 Claims. (Cl. 155—90)

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This invention relates generally to adjustable seat structures and more particularly to improvements in the construction of a vehicle seat to provide for individual adjustment as desired of the seat proper and the seat back.

Among the principal objects of the present invention is the provision of a supporting structure for a vehicle seat assembly in which individually operated means are included for adjustably raising and lowering the seat proper, for adjustably shifting the seat proper forwardly and rearwardly relatively to the seat back, for adjustably varying the inclination of the seat with respect to the horizontal, for adjustably varying the inclination of the seat back relatively to the adjusted plane of the seat proper, and for adjustably shifting the seat assembly as a unit forwardly and rearwardly upon its supporting structure, the several adjusting means being respectively so operative that any desired combination of the aforesaid adjustments may be readily effected to provide a seating arrangement which best suits the individual requirements of a person occupying the seat.

The present invention also has as an object thereof the provision of a supporting structure for a vehicle seat of the character aforesaid wherein means are included for effectively securing the seat proper and the seat back in each of their adjusted positions, the said securing means being at the same time readily releasable to vary the positional adjustment of the seat and seat back as may be desired.

A still further and important object of the present invention is to provide an adjustable seat arrangement of the character above described wherein the several adjustments of the seat proper, seat back and seat assembly are effected by means which are incorporated in the seat structure as component parts thereof, thus obviating the necessity of employing special devices or tools for positionally adjusting the seat.

Other objects and advantages of the present invention will be apparent more fully hereinafter, it being understood that the present invention consists substantially in the combination, construction, location and relative arrangement of parts, all as described in detail in the following specification as shown in the accompanying drawings and as finally pointed out in the appended claims.

In the accompanying drawings which are illustrative of a preferred construction embodying the principles of the present invention:

Figure 1 is a rear perspective view of the adjustable seat structure;

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Figure 2 is a side elevational view thereof showing certain parts broken away and sectioned;

Figure 3 is a perspective view of a detail of the adjusting means for the seat back;

Figure 4 is a rear elevational view of the lower portion of the seat structure as viewed from the line 4—4 of Figure 2;

Figure 5 is a horizontal plan view of the supporting structure for the seat assembly as taken on the line 5—5 of Figure 2;

Figure 6 is a partial plan view of the supporting structure for the seat assembly showing the relation of parts when the seat assembly is shifted forwardly on its supporting structure;

Figure 7 is a transverse sectional view as taken on the line 7—7 of Figure 5;

Figure 8 is a side elevational view of the seat structure showing in dotted lines various adjusted positions of the seat proper and the seat back;

Figures 9 to 16, inclusive, are side elevational views of the seat proper in various adjusted positions thereof;

Figure 17 is a side elevational view of the seat proper in its extreme forward position, a portion thereof being shown in section;

Figure 18 is a side elevational view of the seat back in an adjusted position different from that shown in Figure 8; and

Figure 19 is a side elevational view of the seat proper in its extreme rearwardly adjusted position.

Referring now to the drawings and more particularly to Figures 1 and 2 thereof, it will be observed that the seat assembly of the present invention, which includes a seat proper 10 and a seat back 11, is suitably mounted upon an understructure or supporting frame fixedly secured in position upon the floor of the vehicle, this supporting understructure including a pair of channel-shaped side rails 12—12 disposed with their webs 13—13 in laterally-spaced parallel vertical planes. The forward ends of the side rails 12—12 are interconnected by a transversely extending angle member 14, while their rear ends are interconnected by a transversely extending plate 15, the understructure being thus in the form of a rigid rectangular open frame the opposite longitudinal sides of which are defined by the inwardly extending flanges 16—16 of the side rails. These flanges 16—16 are disposed in a common horizontal plane.

The seat proper 10 is provided upon its bottom with a flat metal plate 17 which is adapted to

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rest upon a supporting carriage 18 in the form of an open rectangular frame composed of angle members suitably welded together as shown. Thus, the opposite side rails of the seat supporting carriage 18 are each formed of a pair of reversely arranged angle members 19—20 welded together to provide a channel-shaped side rail for the carriage 18, each such side rail having a top flange 21 and a bottom flange 22. These side rails of the carriage 18 are in turn interconnected at their front and rear ends by transversely-extending angle members 23 and 24 the top flanges of which are disposed in the horizontal plane of the side rail top flanges 21—21.

The open frame constituting the seat-supporting carriage 18 is substantially coextensive in width and length with the open frame forming the fixed understructure for the seat, and is adapted to be disposed upon such understructure with its side rails in register with the side rails of the understructure. The top flanges 16—16 of the understructure side rails are each provided with a pair of longitudinally spaced elongated slots 25—25, while the bottom flanges 22—22 of the carriage side rails are each provided with a pair of longitudinally spaced openings 26—26 in respective registry with the slots 25—25. Bolts 27 each projecting through an opening 26 and its registering slot 25, secure the carriage frame against vertical and lateral displacement relatively to the fixed understructure, while permitting the carriage to shift longitudinally of the understructure within the limits permitted by the elongated slots 25—25. To eliminate frictional resistance between the seat-supporting carriage and the fixed understructure and so facilitate easy shifting of the carriage, washers 28 are preferably fitted upon each of the securing bolts 27 for disposition between the overlying flanges of the longitudinally extending side rails of the carriage and its supporting understructure.

Rotatably journaled between the opposite side rails of the seat-supporting carriage 18 are a pair of parallel shafts 29 and 30, the shaft 29 being disposed immediately adjacent the front end of the carriage while the shaft 30 is disposed adjacent the rear end of the carriage. To rigidify these shafts, each of them is centrally journaled, as at 31, upon an angle member 32 extending longitudinally between the front and rear members 23 and 24 of the open frame constituting the shiftable seat-supporting carriage, this member 32 being disposed substantially centrally between the side rails of said carriage frame. The shafts 29 and 30 are respectively provided at corresponding ends thereof with laterally turned extensions 33 and 34 forming operating handles for rotating the shafts in one direction or the other.

Suitably fixed to each of the shafts 29 and 30 are a pair of laterally spaced cam members 35—35. These cam members are all of identical form, each being of oblong form in outline with one longitudinal edge 36 thereof inclined with respect to its opposite longitudinal edge 37. It will be observed further that the several identical cam members 35—35 are similarly secured to their supporting shafts so that upon rotation of a given shaft both cam members thereon assume the same angular position relatively to the axis of the shaft. It will be noted also that the cam members are each so eccentrically secured to the shafts that upon rotation of a given shaft corresponding edges of the pair of cams secured thereto may be selectively presented in any one

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of three different positions for engagement with and support of the seat proper 10.

Thus, as appears in Figure 8, when the shaft handles 33 and 34 are in their full line positions as shown, the cam members 35—35 on each shaft are all disposed with their edges 36 uppermost and in engagement with the bottom plate 17 of the seat member 10. In this angularly adjusted position of the cam members 35—35 of both shafts 29 and 30, the seat member 10 is supported in a horizontal plane substantially coincident with the top of the supporting carriage 18.

Upon rotation of the handles 33 and 34 as indicated by the directional arrows in Figure 8 the cam members may be variously positioned angularly with respect to their shaft axes to either raise the seat member 10 vertically into one or the other of two elevated positions, as shown in Figures 13 and 14, or to incline the seat member as variously shown in Figures 9 to 12, inclusive and in Figures 15 and 16. Maximum inclination is obtained as shown in Figures 10 and 15, with minimum inclination as in Figures 11 and 16. Depending upon the relative disposition of the fore and aft cam members, the seat inclination may be such that the front edge of the seat is depressed relatively to its rear edge as shown in Figures 12, 15 and 16, or it may be such that exactly the reverse condition is obtained, the front edge of the seat being then elevated relatively to its rear edge, as shown in Figures 9, 10 and 11. It will thus be apparent that by simple manipulation of the shaft handles 33 and 34, the seat member 10 may be vertically adjusted and inclined into any one of a number of positions to most comfortably accommodate the occupant of the seat.

In order to prevent longitudinal displacement of the seat member 10 relatively to its supporting carriage 18, the front rail 23 of the carriage is fitted with a pair of laterally spaced vertically extending pins 40—40 which are respectively adapted to project into the bottom of the seat member 10 by way of suitable openings 41 provided in the bottom plate 17 of said seat member. As most clearly appears in Figure 2, the bottom plate 17 of the seat member 10 is provided with three pairs of the pin-receiving openings 41; these pairs being spaced lengthwise of the seat member for accommodation of the pins 40—40 in any one pair of the openings depending upon the adjusted position of the seat member longitudinally with respect to its supporting carriage 18. Thus, when the seat is in its full line position shown in Figure 2, the pins 40—40 project through the outermost pair of the openings 41 to prevent shifting of the seat member 10 lengthwise of its supporting carriage 18. In this locked position of the seat member upon its carriage, the depth of the seat member 10 as measured from its front edge rearwardly to the seat back 11 is of least extent. By shifting the seat member 10 forwardly on its supporting carriage so that the pins 40—40 interengage the intermediate pair of openings 41<sup>a</sup>, the longitudinal depth of the seat member may be increased to the extent indicated by the dotted line A of Figure 3, a still further increase in the seat depth, as indicated by the dotted line B of Figure 3, being obtained when the pins 40—40 are interengaged with the rearmost pair of openings 41<sup>b</sup> in the bottom plate 17 of the seat member.

The seat back 11 is carried directly by the supporting carriage 18 for movement therewith. As most clearly appears in Figures 2 and 3, the car-

riage 18 is provided upon each of its opposite sides with a pair of angularly related rigid strap members 42 and 43 forming upright standards between the upper ends of which the seat back 11 is pivotally supported, as at 44. Preferably, the lower ends of the members 42 and 43 are welded to the side rails of the carriage 18, while their upper ends are overlapped and provided with registering openings for reception of a pivot stud formed as a part of a bracket 45 secured to the vertical rear corner edge of the seat back at a point intermediate its upper and lower ends.

Secured to and projecting rearwardly of the seat back supporting members 43 are a pair of wing-like members 46—46 the free ends of which are rigidly interconnected by a transverse bar or rod 47. This transverse bar 47, which is spaced rearwardly of the bottom rear edge of the seat back 11, is centrally provided with a detent plate 48 having formed therein a vertically elongated slot 49. Preferably, the detent plate 48 is somewhat inclined rearwardly and upwardly, as most clearly appears in Figure 2 so that the bottom edge of its slot 49 may most effectively engage one or the other of the notches 50 formed along the bottom edge of a spring-pressed detent bar 51 extending rearwardly of the seat back 10 and through the slot 49 of the detent plate.

As most clearly appears in Figures 1 to 3, inclusive, this notched detent bar 51 is centrally fixed to a horizontally extending shaft 52 oscillatably journalled in a pair of laterally spaced bracket members 53—53 secured to the rear surface of the seat back 11, the shaft being provided at one end thereof with a laterally turned extension to provide an operating handle 54 therefor. In order to impose a bias on the shaft 52 tending normally to depress the detent bar 51 into interlocking engagement with the slotted detent plate 48, the shaft 52 is provided adjacent one of its journalled ends with an angle member 55 having a freely extending arm 56 to which is secured the upper end of a coiled tension spring 57. The lower end of this spring is secured to an arm 58 extending freely from the adjoining shaft-supporting bracket 53, the arrangement being thus such that the spring 57 tends to resiliently maintain the detent bar 51 in interlocking engagement with the detent plate. By depressing the shaft handle 54 as indicated by the arrow in Figure 3, the detent bar 51 may be disengaged from the plate 48 for re-engagement in any one of several different positions for varying, as desired, the vertical inclination of the seat back 11 about its supporting pivots 44. This adjustment of the seat back is, of course, independent of the permissible adjustments of the seat member 10, as hereinbefore described, and consequently various angular relations between the seat back and the seat proper may be readily obtained.

In addition to the foregoing adjustments of the seat back and seat proper, the present invention provides means for positionally adjusting the seat back and seat proper as an assembly longitudinally with respect to the fixed understructure of the seating installation. Thus, as most clearly appears in Figures 2 and 4, the longitudinally extending central member 32 of the supporting carriage 18 is provided toward its rear end with a welded depending plate 59 to the lower end of which is pivotally secured, as at 60, a longitudinally extending bar 61. The rear end of this bar 61 is connected by a coiled tension spring 62 to a part of the carriage 18, such as the member 32, while the forward portion of the bar 61 ex-

tends through a slotted plate 63 welded to the front transverse rail 14 of the fixed understructure. The bottom edge of the bar 61 is provided with a series of longitudinally spaced notches 64 which are selectively engageable with the bottom edge of the slot 65 in the plate 63 to lock the upper seat assembly in any one of several longitudinally adjusted positions. The tension spring 62 operates, of course, to maintain the notched bar 61 interlocked with the detent plate, the bar being adapted to be raised out of engagement with its detent plate for shifting movement relatively thereto by means of a handle 66 welded or otherwise secured to the forward end of the bar. It will be apparent that upon disengagement of the bar 61 from its detent plate 63, the bar may be longitudinally shifted to effect corresponding shift upon the fixed understructure of the seat assembly comprising the seat member 10, the seat back 11 and their supporting carriage 18.

It will be understood, of course, that the present invention is susceptible of various changes and modifications which may be made from time to time without departing from the general principles or real spirit thereof, and it is accordingly intended to claim the present invention broadly as well as specifically as indicated in the appended claims.

What is claimed as new and useful is:

1. In an adjustable seat structure adapted for installation in automotive vehicles, a sub-structure for supporting the adjustable seat, a carriage for the seat shiftably mounted for rectilinear shifting movement upon said sub-structure, and means on said carriage for shiftable support thereon of a seat member, said supporting means for the seat member being independent of said sub-structure and including manually adjustable cam members respectively operative adjacent the fore and aft ends of the seat member to vary the inclination thereof with respect to the horizontal.

2. In an adjustable seat installation for automotive vehicles, a seat assembly including a substantially horizontally disposed seat member, a substantially vertically disposed seat back and a supporting carriage for said seat member and seat back, a sub-structure upon which said carriage is longitudinally shiftable, cam means on said carriage mounted independently of said sub-structure, said means being selectively operative to adjust the elevation of the front and rear ends of said seat member relatively to said carriage whereby to vary the pitch of the latter with respect to the horizontal, and means for securing the seat member against longitudinal or lateral displacement with respect to its supporting carriage.

3. In an adjustable seat installation for automotive vehicles, an upholstered seat member having a flat bottom plate of rigid material, a supporting carriage for said seat member in the form of a substantially horizontally disposed open frame having laterally spaced side rails adapted to underlie and support the opposite sides of said seat member, a pair of oscillatably mounted shafts extending transversely of said carriage side rails and disposed respectively adjacent the front and rear ends of said seat member beneath the bottom plate thereof, laterally spaced cam members eccentrically fixed to each of said shafts with the edges thereof in supporting engagement with the bottom plate of said seat member, said cam members being operative upon rotation of said shafts to vary the pitch and elevation of the seat relatively to said supporting carriage.

4. In an adjustable seat installation for automotive vehicles, a seat member having a rigid flat bottom, a supporting carriage for said seat member in the form of a substantially horizontally disposed open frame having laterally spaced parallel side rails adapted to underlie and support said seat member, a shaft extending transversely of said carriage side rails and oscillatably journaled therein, said shaft being disposed adjacent an end of the supporting carriage and beneath the bottom of said seat member, and a pair of cam members fixedly secured to said shaft in laterally spaced relation for engagement with the bottom of said seat member whereby to support the latter, said cam members being of identical polygonal shape and being similarly disposed eccentrically with respect to the shaft whereby upon rotation of said shaft different corresponding edges of said cam members are presented in engagement with the bottom of the seat member to vary its elevation and pitch relatively to a predetermined horizontal plane.

5. In an adjustable seat installation for automotive vehicles, a flat-bottomed seat member, a supporting carriage for said seat member in the form of a substantially horizontally disposed open frame having laterally spaced parallel side rails underlying and supporting said seat member, a shaft extending transversely of said carriage side rails and oscillatably journaled therein, said shaft being disposed adjacent an end of the supporting carriage and below the bottom of said seat member, a pair of identical polygonally shaped cam members fixedly secured to said shaft in laterally spaced relation, said cam members being similarly arranged eccentrically with respect to the shaft whereby upon rotation of the latter different corresponding edges of the cam members may be selectively presented in engagement with the seat member to vary its elevation and pitch relatively to a predetermined horizontal plane, means external of said supporting carriage for rotating said shaft to selectively present any one pair of corresponding cam edges in supporting engagement with the seat member, and means for releasably securing said seat member in longitudinally adjusted position on said supporting carriage.

6. In an adjustable seat installation for automotive vehicles, an understructure including a pair of laterally spaced side rails each having a horizontally disposed longitudinally slotted flange, a supporting carriage for a seat member including a pair of laterally spaced side rails respectively in register with the slotted flanges of said understructure and having bolts projecting through the slots of said flanges to secure said carriage against all but longitudinal movement relatively to said understructure, a seat member loosely supported upon said carriage, and cam means mounted upon the carriage for varying the pitch and elevation of the seat member relatively to said carriage.

7. In an adjustable seat installation for automotive vehicles, an understructure including a pair of laterally spaced side rails each having a horizontally disposed longitudinally slotted flange, a supporting carriage for a seat member including a pair of laterally spaced side rails

respectively in register with the slotted flanges of said understructure and having bolts projecting through the slots of said flanges to secure said carriage against all but longitudinal movement relatively to said understructure, a seat member loosely supported upon said carriage, cam means mounted upon the carriage for varying the pitch and elevation of the seat member relatively to said carriage, said seat member being longitudinally shiftable upon said carriage, and coacting pin and socket means on said seat member and carriage selectively operative to secure said seat member in longitudinally adjusted position upon said carriage.

8. In an adjustable seat installation for automotive vehicles, an understructure including a pair of laterally spaced side rails each having a horizontally disposed longitudinally slotted flange, a supporting carriage for a seat member including a pair of laterally spaced side rails respectively in register with the slotted flanges of said understructure and having bolts projecting through the slots of said flanges to secure said carriage against all but longitudinal movement relatively to said understructure, a seat member loosely supported upon said carriage, and cam means mounted upon the carriage for varying the pitch and elevation of the seat member relatively to said carriage, said seat member being securable in longitudinally adjusted position upon said carriage, and said carriage and its supported seat member being longitudinally shiftable relatively to said understructure.

9. In an adjustable seat installation for automotive vehicles, a sub-structure for supporting the adjustable seat, a carriage for the seat shiftable mounted upon said sub-structure, means on said carriage for shiftable support thereon of a seat member, said supporting means for the seat member including manually adjustable cam members respectively operative adjacent the fore and aft ends of the seat member to vary the elevation and pitch thereof with respect to its supporting carriage, and means carried by said supporting carriage and projecting forwardly of said sub-structure for locking said supporting carriage in longitudinally adjusted position upon said sub-structure.

10. In an adjustable seat installation as defined in claim 9 wherein said last-mentioned means includes a pivoted detent bar resiliently pressed into interlocking engagement with a detent mounted upon said sub-structure.

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