Nov. 21, 1939. G. K. BRADFIELD, JR 2,180,505

RECLINING SEAT MECHANISM

Filed June 15, 1937

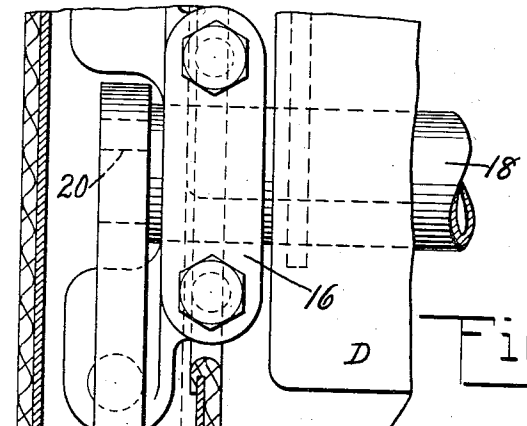

Fig. 2.

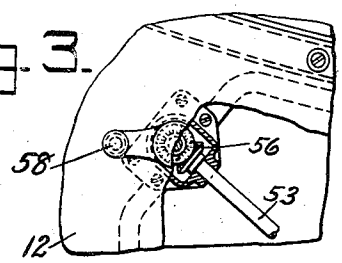

Fig. 3.

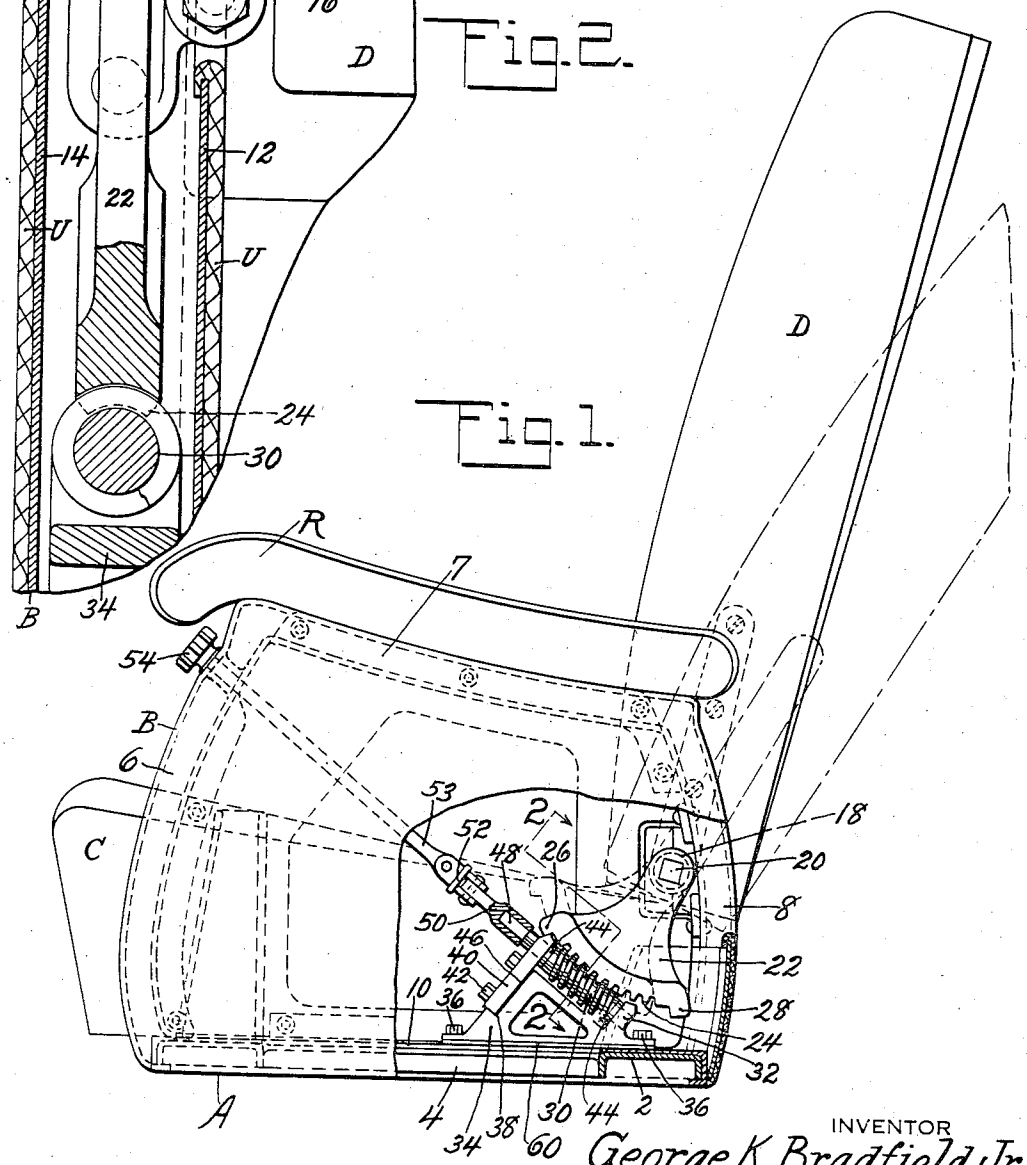

Fig. 1.

INVENTOR
George K. Bradfield, Jr.
BY
Donald U. Rich
ATTORNEY

Patented Nov. 21, 1939 2,180,505

UNITED STATES PATENT OFFICE

2,180,505

RECLINING SEAT MECHANISM

George K. Bradfield, Jr., Hackensack, N. J., assignor to American Car and Foundry Company, New York, N. Y., a corporation of New Jersey

Application June 15, 1937, Serial No. 148,251

3 Claims. (Cl. 155—161)

This invention relates to seats in general and in particular to reclining seats designed for use on rail or other mobile vehicles.

In the past a great deal of trouble and annoyance has been occasioned due to the vibration of the seat back whenever a reclining mechanism was used. It has been impossible in the past to properly design and arrange the reclining mechanism so as to eliminate vibration of the back throughout the life of the seat. It is an object, therefore, of this invention to provide an extremely simple and compact arrangement for controlling the movements of the seat back.

A further object of the invention is the provision of a mechanism for control of a seat back which may be readily adjusted to compensate for wear thereby eliminating vibration of the seat back.

A still further object of the invention is the provision of a mechanism for control of a seat back in which the number of moving parts has been reduced to a minimum and the number of points reduced at which wear might occur.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawing, in which:

Figure 1 is an end view of the seat with parts broken away to better disclose the reclining mechanism;

Fig. 2 is a sectional view taken on substantially line 2—2 of Figure 1, and

Fig. 3 is a slight modification showing the different placement of the operating handle.

Referring now more particularly to the drawing, it can be seen that the seat is generally of conventional design in that it comprises a base frame A with end frames B secured thereto and between which the seat cushion C and movable seat back D are arranged. The base frame A may be of any preferred or desired construction, but in the instance shown is formed with front and rear downwardly facing channels 2 which are suitably connected together by cross bars 4 as is customary and usual in the art. The end frames are mounted at the end portions of the base frame, as is customary, and are connected to the base frame in any suitable or desired manner; the end frames comprising front, top and rear portions or sections 6, 7 and 8, respectively, which may be of any desired form and cross section. A plate 10 extends between and connects the lower end portions of the front and rear pieces 6 and 8 of the end frames and may and preferably does extend between said end frames. The end frames are provided with inner and outer plates 12 and 14 upon which the upholstery U is mounted. The rear side piece of each end frame is formed with a suitable bearing 16 adapted to receive seat back trunnion 18 which is rigidly secured to the seat back and extends outwardly beyond each of the bearings. The extended end of the pivot is preferably squared as at 20 and has non-rotatably mounted thereon a worm gear sector 22. This sector is formed with gear teeth 24 and projecting stops 26 and 28 respectively adapted to limit the forward and rearward movements of the seat back. The gear teeth are adapted to mesh with a worm 30 rotatably carried by a supporting bracket which is preferably formed as a casting having a lower integral worm bearing portion 32 and a base portion 34 rigidly secured to the adjacent seat frame by suitable means such as bolts 36. This casting is generally triangular in form and has one of the legs formed with a recess 38 adapted to receive an upper removable bearing plate 40 which will be secured in position by suitable means such as bolts 42. Thrust bearings 44 are interposed between the upper bearing plate and lower bearing portion and any wear of these thrust bearings may be compensated for by removal of shims 46 interposed between the casting and the removable bearing plate. The shaft of the worm is extended and provided with a squared upper end 48 over which may be slipped a wrench like end 50 of an operating rod having flexible coupling 52 joined by shaft 53 to a suitable operating means such as knob 54 (Fig. 1). As shown in Figure 1 the shaft 53 extends through the front side piece of the end frame thus placing the operating knob on the front face of the end and beneath the arm rest R. In case it is desired to locate the operating means on the inner side of the end, then shaft 53 will be coupled to suitable gearing 56 adapted to be operated by a crank 58 carried on an inner face of the end as clearly shown in Fig. 3.

It is to be noted that any wear permitting lengthwise movement of the worm may be compensated for by removal of shims 46, while any sidewise play may be compensated for by the addition of shims 60 interposed between the end frame and the worm supporting casting. Normally, these shims will not be necessary but may be of assistance in the first assembly of the unit since by their use any inequalities due to improper placing of the securing means 36 or bearing 16 may be compensated for. It should also be noted that all operating mechanism is located

immediately adjacent the seat back pivot and is entirely independent of the long connections to the operating means, at least insofar as seat back vibrations are concerned.

The operation of the mechanism is as follows and assuming the parts to be in the position as shown by full lines of Fig. 1: Rotation of the operating knob 54 will cause rotation of the worm which through its teeth will transmit a thrust to the gear sector 22 and seat pivot 18, thus causing a reclining movement of the seat back. Continued rotation of the knob will continue the lowering of the seat back until it has reached the position as shown by line and dash of Fig. 1, in which position the stop 28 will be in abutment with integral lower bearing 32 and further movement of the seat back in a reclining direction will be prohibited. A reverse operation of the knob will return the reclined back to its upright position with the stop 26 abutting upper removable bearing plate 40, thus limiting the forward movement of the seat back. As previously pointed out, wear of the bearings and worm shaft, as well as improper adjustment between the worm and gear sector, may be compensated for by addition of shims 60, while wear of the thrust bearings may be compensated for by removal of the shims 46.

While the mechanism has been described more or less in detail, it is obvious that various modifications and rearrangements of parts will be apparent to persons skilled in the art and all such modifications and rearrangements of parts are contemplated as fall within the scope of the following claims:

What is claimed is:

1. A reclining seat comprising in combination, a base frame, end frames secured to the base frame, a seat back pivotally supported by the side frames, a gear sector rigidly connected to the seat back and movable therewith, said gear sector including spaced projections, a bracket fixed to the base frame adjacent the gear sector and including a projection formed with a bearing portion and a stop, said bracket being formed at its front portion with a shoulder, a plate removably secured to said shoulder and provided with a bearing in alinement with said fixed bearing, said plate including a stop element, the stop elements being positioned to engage said sector projections to limit the movement of said sector and seat back, a gear mounted in said bearings for engagement with said gear sectors, and means for rotating said worm.

2. In a reclining seat, a base frame, end frames secured to the base frame, a seat back pivotally supported between and by the end frames, and means for shifting said seat back on its pivotal support comprising a gear sector rigidly secured to and depending from the seat back, a worm rotatably supported by the base frame and arranged in meshing relation with the gear sector, and operating means supported by the end frame and connected with the worm for actuating the latter.

3. In a reclining seat, a base frame, end frames secured to the base frame, a seat back pivotally supported between and by the end frames, and means for shifting the seat back on its pivotal support comprising a gear sector rigidly secured to and depending from the seat back, a bracket secured to the base frame and provided with end bearings, a worm supported by said bearings and arranged in meshing relation with said gear sector, said gear sector being provided with end projections adapted to contact respectively with the bearings to limit movement of said gear sector, and operating means supported by the end frame and connected with the worm for actuating the latter.

GEORGE K. BRADFIELD, JR.