Dec. 16, 1941. H. R. DE VEAU 2,266,010

APPARATUS FOR EFFECTING SIMULTANEOUS MOVEMENT OF INTERRELATED MEMBERS

Filed June 8, 1940 2 Sheets-Sheet 1

Fig. 1.

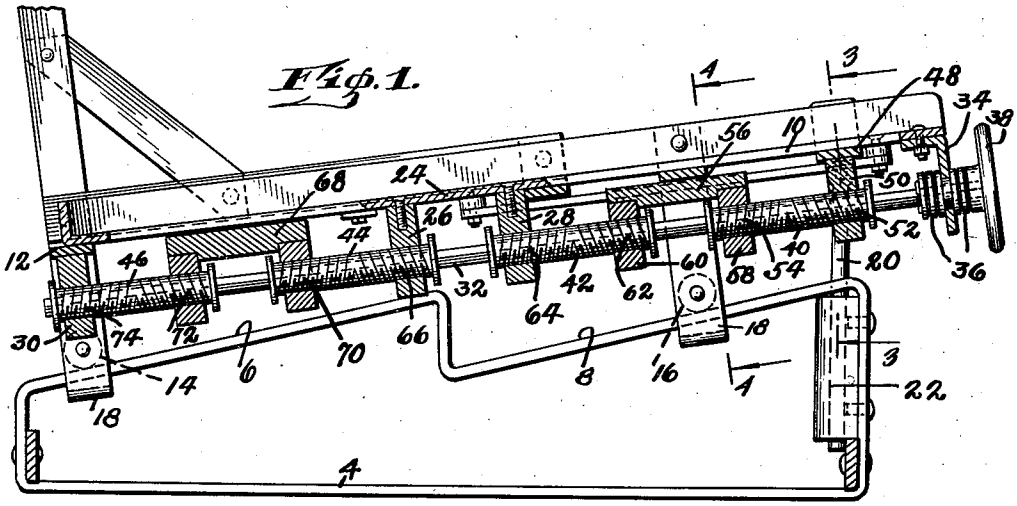
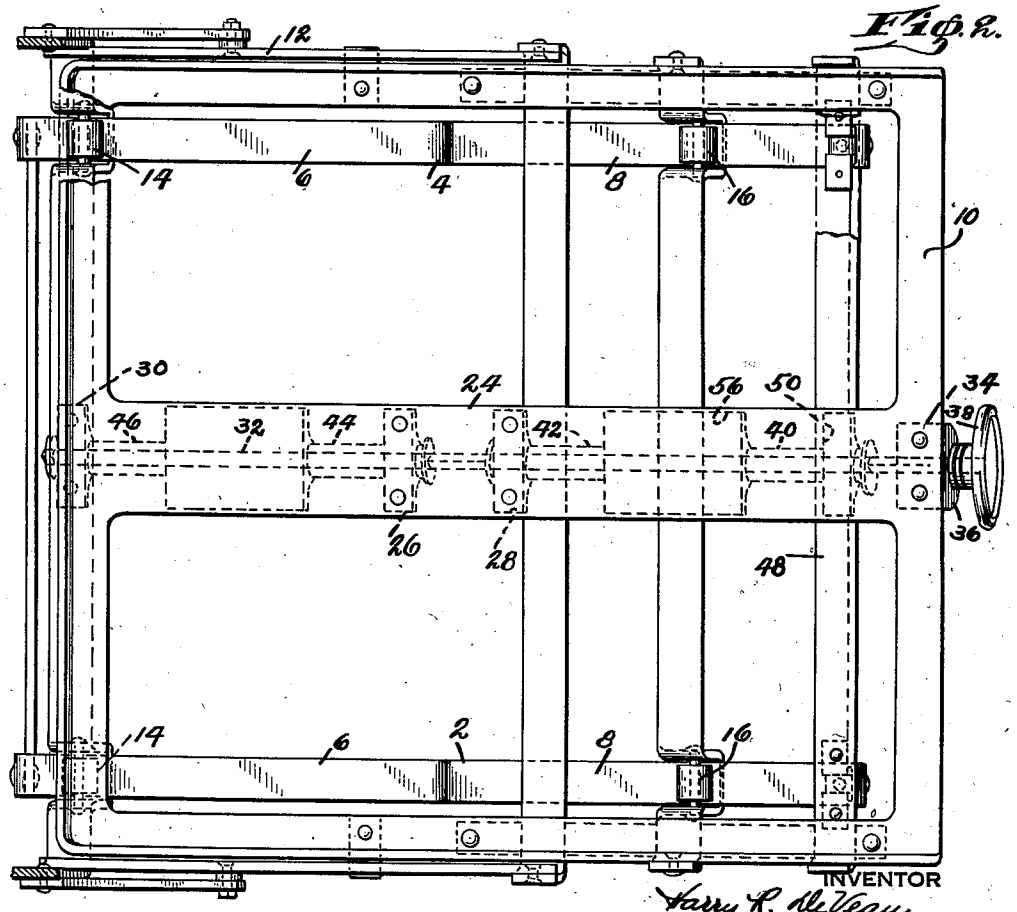


Fig. 2.



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Fig. 3.

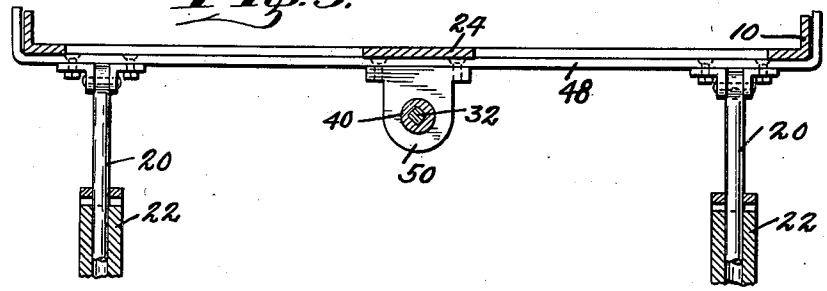


Fig. 4.

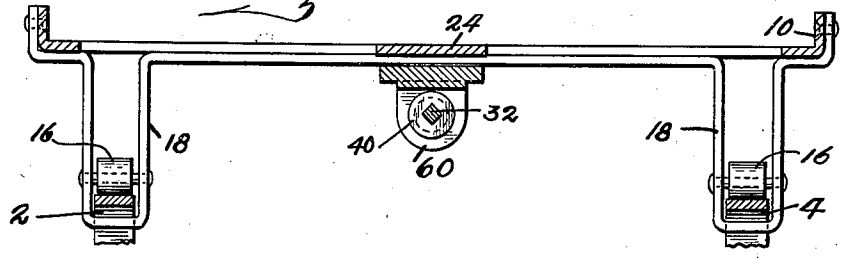
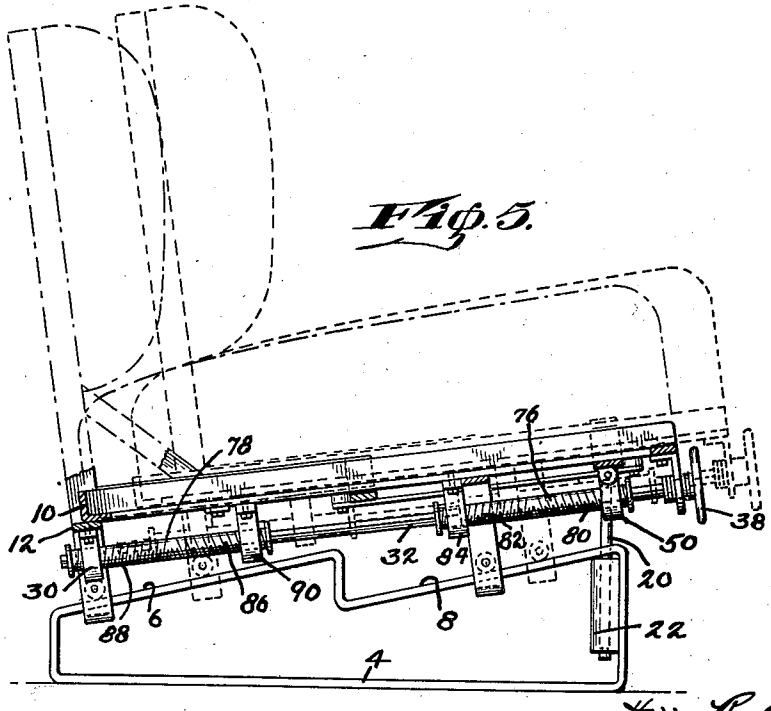


Fig. 5.



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APPARATUS FOR EFFECTING SIMULTANEOUS MOVEMENT OF INTERRELATED MEMBERS

Harry R. De Veau, Port Chester, N. Y.; Winifred De Veau administratrix of said Harry R. De Veau, deceased

Application June 8, 1940, Serial No. 339,409

6 Claims. (Cl. 155—14)

This invention is directed to an apparatus for effecting movement of a plurality of inter-related members.

The apparatus has numerous uses so for the sake of clarity of description it will be described as applied to adjustable seats.

One of the objects of my invention is the provision of a construction wherein a plurality of members may be advanced or retracted simultaneously but at different relative speeds. Thus in case of seats, for example, the seat proper may be advanced or retracted, the back rest of the seat moving in the same direction as the seat but for a different distance, or what amounts to the same thing at a different speed.

Another object of my invention is the provision of a construction such as just outlined wherein the angle of the seat and back rest with respect to the horizontal is varied during the movement of these two members.

A still further object of my invention is the provision of a construction for effecting movement or adjustment of a member or a plurality of members wherein due to my peculiar construction only the minimum of movement of the adjusting mechanism is required to effect the maximum movement of the member or members.

In the accompanying drawings:

Fig. 1 is a part sectional side elevational view of one embodiment of the invention;

Fig. 2 is a plan view of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1; and

Fig. 5 is a view similar to Fig. 1 of another embodiment of the invention.

Referring to the drawings in detail and first of all to Figs. 1 to 4, inclusive: 2 and 4 designate the side frames of the apparatus. It will be noticed that each side frame is provided with two inclined surfaces designated 6 and 8.

Resting upon the side frames is a carriage which for purposes of this description comprises a seat portion 10 and back rest 12. The seat 10 is provided at each side, front and rear, with rollers 14 and 16, the rollers 14 at all times riding on the inclined surfaces 6 of the side frames, the rollers 16 riding at all times on the inclined surfaces 8 of the side frame. The rollers are carried in straps 18 which encircle the side frames.

Near the forward edge of the seat 10 the frame of my apparatus is provided with vertically extending plungers 20 moving in guides 22. These plungers are provided for the purpose of steadying the seat as the same is raised and lowered when adjusting the seat along the inclined surfaces 6 and 8.

The seat 10 is provided with a flat plate 24 extending from the front to the rear thereof and rigidly secured to the same are two nuts 26 and 28. These nuts are oppositely threaded. The back rest 12 carries a nut 30 which is in line with the nuts 26 and 28.

Extending lengthwise of the seat and lying beneath the bar 24 is a rod 32, the forward end of this rod passing through a bracket 34 carried at the front edge of the seat 10. The rod 32 is held against endwise movement in this bracket 34 by washers 36 or other convenient means but moves endwise with the seat as the seat is moved forwardly and rearwardly, the bracket moving with the seat. The rod 32 is adapted to be rotated by a hand wheel 38 or other convenient means.

The rod 32 is squared or has other out-of-round shape and extends through four sleeves 40, 42, 44 and 46. These sleeves are slidable on the rod but rotate with it by reason of its square or other non-circular cross section.

Extending transversely of the seat adjacent the front edge thereof is a fixed bar 48. This bar is secured at its ends to the plunger 20 in the guides 22 which in turn are secured to the fixed frame 4. At the center of this bar 48 is a fixed nut 50 which is mounted on the underside of the bar and receives the sleeve 40. The sleeve 40, as will be seen from Fig. 1, is threaded exteriorly at each end, the threads 52 at one end being of the opposite hand to the threads 54 at the other end of the sleeve.

Lying beneath the bar 24 is a nut 56. The end 58 of this nut receives the threads 54 of the sleeve 40, while the end 60 of the nut receives the end of the sleeve 42, the threads 62 of which are of the same hand as the threads 52 of the sleeve 40. This nut 56 can move forwardly or rearwardly but cannot rotate by reason of its engagement with the underside of the bar 24.

The sleeve 42 at its end opposite the threads 62 is provided exteriorly with threads 64 opposite in hand to the threads 62 and this end of the sleeve is threaded into the nut 28 which, as above explained, is rigidly secured to the bar 24.

The sleeve 44 is threaded at one end into the nut 26 previously referred to and which is rigidly secured to the bar 24, the threads 66 at this end of the sleeve being of the same hand as the threads 62 and 52 of the sleeves 42 and 40, respectively. The other end of this sleeve 44 is threaded into one end of a nut 68 which lies

beneath the bar 24 but is not secured thereto, the threads 70 at this end of the sleeve being of the opposite hand to the threads 66 but of the same hand as the threads 64 and 54 of the sleeves 42 and 40, respectively. The opposite end of the nut 68 receives the sleeve 46, the threads 72 of which are of the same hand as the threads 66 of the sleeve 44. The other end of the sleeve 46 is threaded into the nut 30 carried by the back rest 12, the threads 74 at this end of the sleeve 46 being of the opposite hand to the threads 72 at the other end of the sleeve but of the same hand as the threads 70, 64 and 54 of the sleeves 44, 42 and 40, respectively.

It will be seen from all of the foregoing that if the handle 38 is rotated in an anti-clockwise direction to rotate the actuating rod 32 the seat 10 and back rest 12 will be moved forwardly and of course if this wheel is rotated in the opposite direction then the seat and back rest will be moved rearwardly.

It will be appreciated, furthermore, that were the rod 32 merely threaded into the nut 50 the seat and back rest would move the same distance.

However, the object of this invention, as above pointed out, is to provide for a quick adjustment of the seat and back rest with the minimum movement of the wheel 38 and to have the seat and back rest move different distances so that not only are these two members adjusted simultaneously but they are adjusted relatively to each other.

As pointed out above, the sleeves 40, 42, 44 and 46 are slidable along the rod 32 but at the same time rotate with the rod. Assuming the parts to be in the position shown in Fig. 1 and that the rod 32 is rotated in an anti-clockwise direction. Under these conditions the sleeve 40 will move to the right, as viewed in Fig. 1, for a certain distance depending upon the pitch of the threads 52 and the amount the rod 32 is rotated.

The nut 50 it is to be remembered is stationary. On this same movement the nut 56 which is threaded on the other end of the sleeve 40 will be advanced to the right a greater amount than the sleeve because not only does the nut advance with the sleeve 40 but rides along the sleeve due to the fact that the threads 54 of the sleeve are of the opposite hand to the threads 52 at the other end of the sleeve.

Inasmuch as 60 is in effect integral with 58 it is bound to move to the right the same distance as 58 carrying with it the sleeve 42. However, the threads 62 of the sleeve 42 are of the same hand as the threads 52 of the sleeve 40. Consequently advance of the sleeve 42 will be greater than the advance of the sleeve 40.

The sleeve 42 is threaded into the nut 28 which is secured to the seat 10 and will draw the nut 28 and hence the seat 10 to the right, the nut 28 also traveling along the sleeve to the right due to the fact that the threads 64 are of the opposite hand to the threads 62 on the same sleeve. The seat therefore moves to the right, as viewed in the drawings, when the bar 32 is rotated anti-clockwise, at a greater distance for a given turn of the hand wheel 38 than would be the case if the bar 32 were merely threaded into the fixed nut 50 and attached to the seat. Very little rotation is necessary, therefore, of the hand wheel 38 to effect considerable longitudinal movement of the seat 10. Of course it will be understood that on the reverse rotation of the wheel 38 the seat 10 will be adjusted rearwardly.

Inasmuch as the back rest 12 is connected to the seat 10 so far as adjustment is concerned, through the nuts 26, 68 and 30 and the sleeves 44 and 46, the back rest 12, it is apparent, must move forward at least as far as the seat.

The present construction, however, provides that the movement of the back rest be greater than that of the seat. It is to be remembered that on the assumed rotation of the hand wheel 38 the sleeve 44 which is threaded into the nut 26 carried by the seat and into the non-rotatable nut 68, is rotated anti-clockwise also, and inasmuch as the sleeve 44 is threaded into the nut 26 by threads 66 which are of the same hand as the threads 62 on the sleeve 42, the sleeve 44 will move forward through the nut 26; in other words, the sleeve 44 is moved forward a greater distance than the nut 26 and hence a greater distance than the seat 10. The nut 68 is threaded on the sleeve 44 by threads 70 which are of the opposite hand to the threads 66 so it will be seen that the nut 68 will be advanced further than the sleeve 44. The nut 68 is threaded on the sleeve 46, the threads 72 being of the same hand as the threads 66 of the sleeve 44, so that the sleeve 46 will move forward further than the sleeve 44 and by reason of the fact that the threads 74 of the sleeve 46 which engage the nut 30 secured directly to the back rest 12 are of the opposite hand to the threads 72 on the sleeve 46, the nut 30 and hence the back rest will move forward at a greater distance than the sleeve 46.

The net result of all this is that the seat 10 by reason of my novel arrangement may be advanced or retracted a certain distance depending upon the amount of rotation given the bar 32 and the pitch of the threads by which the bar is connected to the seat, the back rest 12 at the same time moving in the same direction as the seat but for a greater distance.

In the embodiment of my invention as illustrated in Fig. 5, I show the same idea as just described but with less differential between the amount of movement of the seat and back rest. In this embodiment of my invention the bar 32 is equipped with but two sleeves designated 76 and 78. The sleeve 76 is threaded exteriorly as in the case of the sleeves of Fig. 1; the threads 80 at one end of the sleeve being of the opposite hand to the threads 82 at the opposite end of the same sleeve. The sleeve is threaded at one end into the fixed nut 50, the other end of the tube being threaded into a nut 84 which is attached directly to the chair seat 10. The sleeve 78 is threaded exteriorly, the threads 86 at one end of the sleeve being of the same hand as threads 80 but opposite to the threads 88 at the other end of the sleeve. The end bearing the threads 86 is threaded into a nut 90 carried by the chair seat while the end bearing the threads 88 is threaded into the nut 30 carried by the back rest.

It will be apparent that if the wheel 38 is rotated in an anti-clockwise direction that the sleeve 76 will be moved to the right, as viewed in Fig. 5, a certain distance depending upon the amount of rotation of the wheel 38 and the pitch of the threads 80. By reason of the fact that the threads 82 on this sleeve are of the opposite hand to the threads 80, the nut 84 which is attached directly to the chair seat 10 will move forward for a greater distance than the sleeve 76 so that but slight rotation of the wheel 38 is necessary for considerable forward movement of the seat. Inasmuch as the nut 90 is attached to the seat 10 and the sleeve 78 is threaded into this nut by threads 86 of the same hand as the

threads 80 the sleeve 78 will be advanced a greater distance than the seat. The sleeve 78 is threaded into the nut 30 by threads of the opposite hand to the threads 86 so that the nut 30 will be advanced along the sleeve, and the back rest 12 advanced for a greater distance than the seat.

It will be seen from all of the foregoing that I have provided a construction embodying simple mechanism whereby two members may be moved in the same direction but for different distances simultaneously with minimum movement of the operating mechanism.

It is to be understood that changes may be made in the details of construction and arrangement of parts without departing from the spirit and scope of my invention.

What I claim is:

1. In combination, a seat member, a back rest therefor, a rotatable adjusting rod, sleeves slidably mounted on and rotatable with said rod, a fixed nut into which one end of one of said sleeves is threaded, a movable nut attached to the seat member into which the opposite end of the last mentioned sleeve is threaded, a second nut attached to the seat member and receiving one end of the other of said sleeves, the opposite end of the last mentioned sleeve being threaded into the back rest, the opposed ends of each of said sleeves being oppositely threaded, whereby upon rotation of said rod the seat and back rest will be moved bodily in the same direction simultaneously, the back rest moving a greater distance than the seat, the latter moving further than the sleeve engaged by the said fixed nut.

2. In combination, a seat member, a back rest therefor, means for advancing and retracting the seat and back rest simultaneously but at different speeds so as to vary their relative disposition, and inclined supports for the seat and back rest for tilting the same during adjustment.

3. In combination, a seat member, a back rest therefor, means for advancing and retracting the seat and back rest simultaneously and in the same direction but at different speeds so as to vary their relative disposition, an inclined support for the seat and back rest for tilting the same during adjustment, and steadying means for the seat.

4. In combination, a seat member, a back rest therefor, a rod extending beneath said seat and back rest, sleeves carried by said rod, said sleeves being rotatable with and slidable relatively to said rod, the opposite ends of each sleeve being oppositely threaded, a fixed nut receiving the threaded end of one sleeve, a non-rotatable nut attached to the seat member receiving the other end of the last mentioned sleeve, a nut attached to the seat member receiving the end of the other sleeve which is threaded similarly to the end of the sleeve received by said fixed nut, the other end of the last mentioned sleeve being threaded into the back rest.

5. In combination a fixed support, a pair of members to be adjusted, a rotary shaft mounted in one of said members, a plurality of sleeve means having oppositely threaded end portions carried by said shaft and rotatable therewith and slidable relatively thereto, a fixed nut on said support and receiving the threaded end of one sleeve means, a non-rotatable nut attached to one of said members and receiving the other end of said last mentioned sleeve means, a second non-rotatable nut attached to the same member and receiving one end of another of said sleeve means and a nut fixed to the other member receiving the other end of the last mentioned sleeve means whereby upon rotation of the shaft said members will be adjusted simultaneously in the same direction longitudinally of the shaft and at different speeds relatively to each other.

6. In combination a fixed support, first and second members to be adjusted relatively to each other and to said support, a rotary shaft mounted in one of said members, a set of oppositely threaded sleeves mounted on said shaft and rotatable therewith and movable longitudinally thereof, a fixed nut attached to the said support and receiving one end of one of said sleeves, a non-rotatable nut attached to said first member and receiving the oppositely threaded end of another of the sleeves of said set, a second set of oppositely threaded sleeves mounted on said shaft and rotatable therewith and movable longitudinally thereof, a nut fixed to the said first member and receiving one end of one of the last mentioned sleeves, a non-rotatable nut attached to the said second member and receiving the oppositely threaded end of another of the second set of sleeves, whereby rotation of said shaft will adjust said members simultaneously in the same direction longitudinally of the shaft, one of said members moving a greater distance than the other.

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