(No Model.) 4 Sheets—Sheet 1.

M. N. FORNEY.

REVERSIBLE BACK FOR CAR OR OTHER SEATS.

No. 488,992. Patented Jan. 3, 1893.

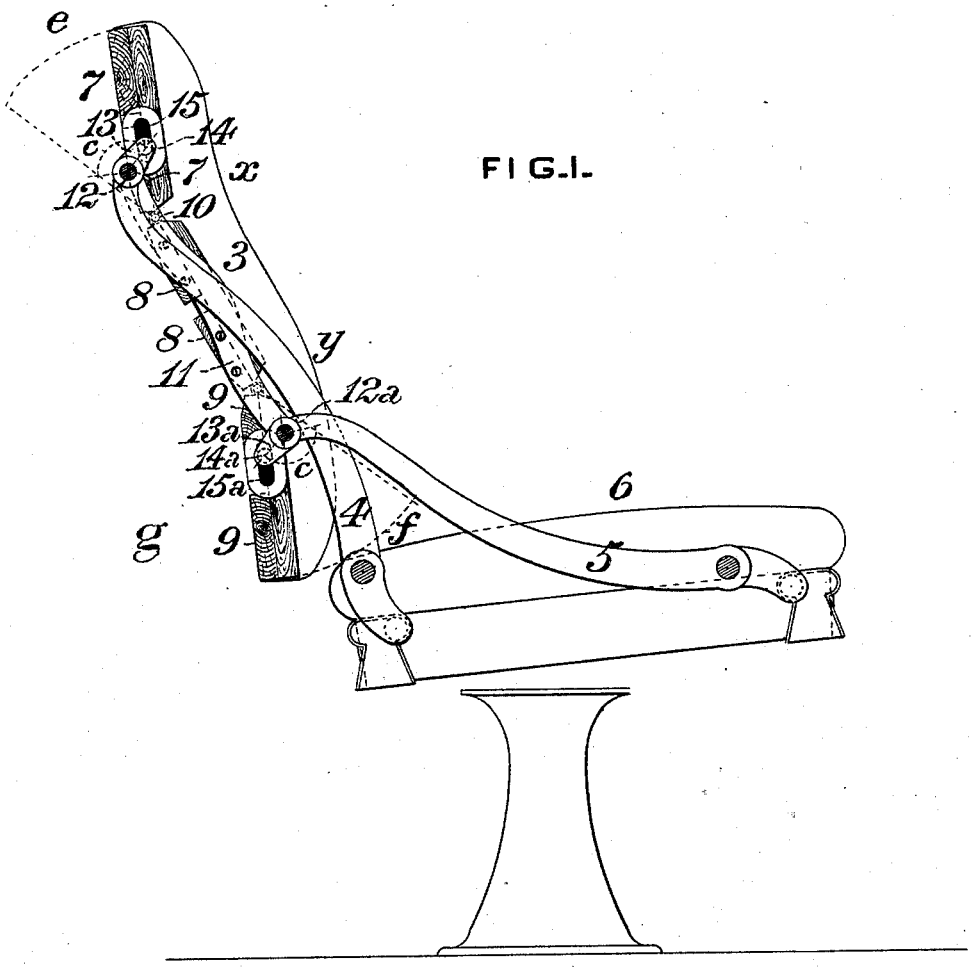

FIG. 1.

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F. E. Gaither

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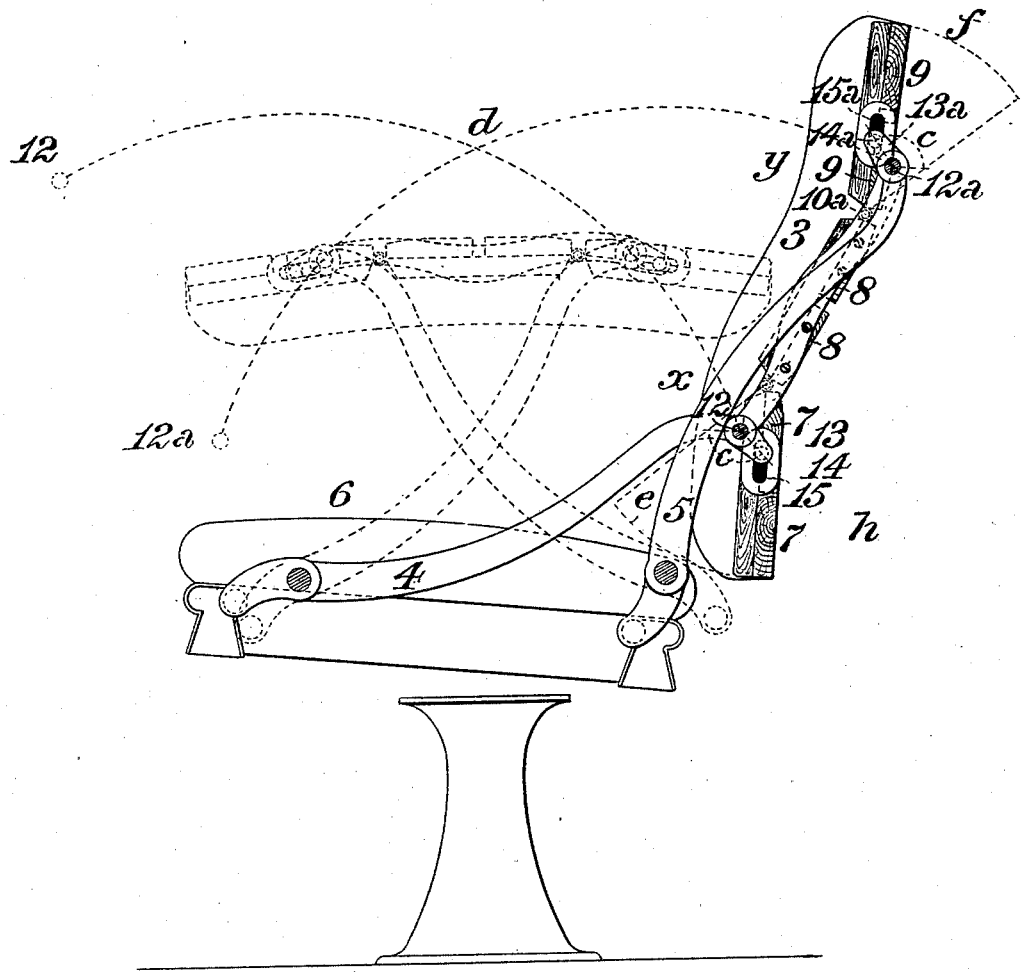
FIG. 2.



WITNESSES:

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M. N. FORNEY.

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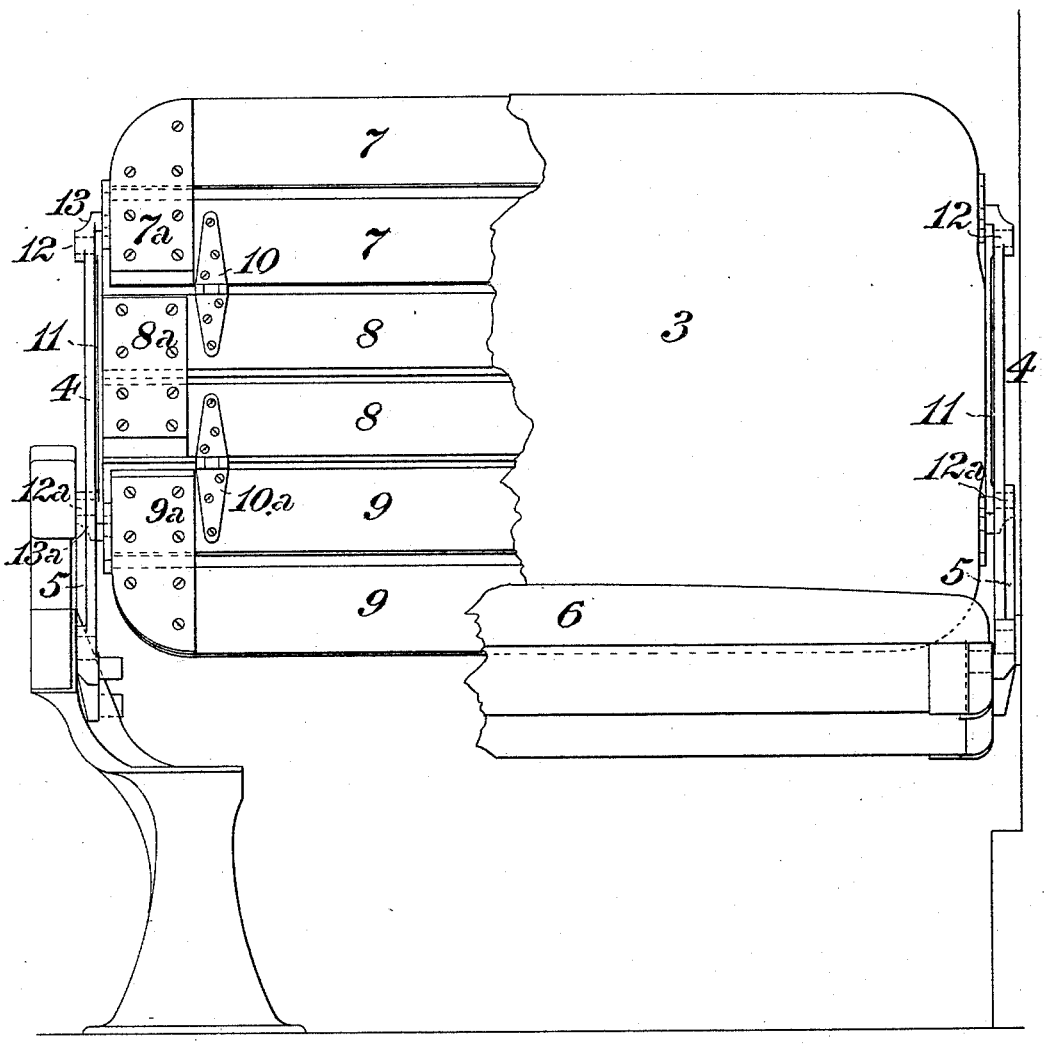
FIG. 3.



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M. N. FORNEY.

REVERSIBLE BACK FOR CAR OR OTHER SEATS.

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FIG. 4.

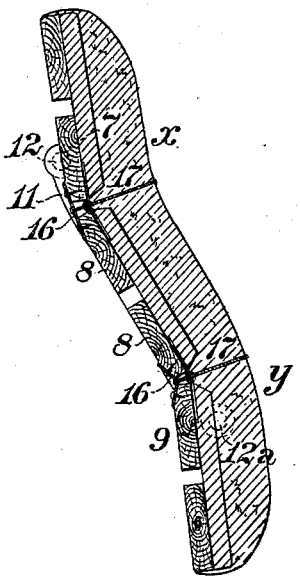
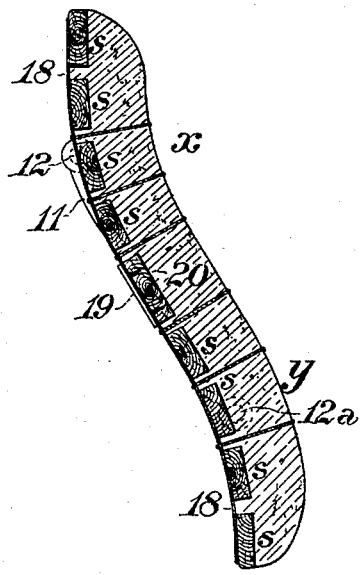


FIG. 5.



WITNESSES:

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John Howden Bell.

ATTORNEY

UNITED STATES PATENT OFFICE.

MATTHIAS N. FORNEY, OF NEW YORK, N. Y.

REVERSIBLE BACK FOR CAR OR OTHER SEATS.

SPECIFICATION forming part of Letters Patent No. 488,992, dated January 3, 1893.

Application filed May 16, 1892. Serial No. 433,144. (No model.)

To all whom it may concern:

Be it known that I, MATTHIAS N. FORNEY, of the city, county, and State of New York, have invented a certain new and useful Improvement in Reversible Backs for Car or other Seats, of which improvement the following is a specification.

My invention relates more particularly to railroad car-seats of the class exemplified in Letters Patent of the United States Nos. 324,825 and 360,148, granted and issued to me under dates of August 25, 1885, and March 29, 1887, and is an improvement on the construction described in an application for Letters Patent filed by me April 4, 1892, Serial No. 427,695. It is not, however, in any wise, limited to the class above specified, being likewise applicable to seats and backs of construction other than those of said Letters Patent and application.

The object of my present invention is to provide a reversible seat-back having the capability of being so changed in form or outline by the act of reversal, that in either position after reversal it shall present a lower convex portion and an upper concave portion, for the support of the lumbar region of the back and shoulder blades, respectively, of the occupants of the seat.

To this end my invention, generally stated, consists in the combination of a reversible seat back, reversing arms, and cranks or equivalent mechanism connected to the arms and back whereby a change of form of the seat-back in and by its reversal is effected.

The improvement claimed is hereinafter fully set forth.

In my application for Letters Patent Serial No. 427,695 above referred to, several specific means, all embodying the same generic features were described as provided for effecting the change of form of a seat back in and by its reversal, and my present invention relates to a further improved mechanism for the same purpose.

In the accompanying drawings; Figure 1 is an end view of a car seat and back illustrating an application of my invention, the back being shown in one of the positions occupied when in use, the arm rest or seat end nearest the observer being omitted, and the outline of the upholstery only being shown; Fig. 2, a similar view the back being shown by full lines in the position opposite to that in Fig. 1, and by dotted lines in the position occupied when turned half way over, Fig. 3, a front view of part of the seat and of the back, the covering and upholstery of the portion of the back to the left of the figure, and a part of the seat being omitted. Fig. 4, a vertical section through the seat back shown in the preceding figures, and; Fig. 5, a similar section through a seat back having its rigid sections connected by flexible material instead of hinges or articulations.

My invention is herein illustrated as applied in connection with a seat-back 3, which, as in the Letters Patent and application before referred to, is coupled by reversing arms 4, 5, to suitable end supports, the seat 6 being connected to and supported by the lower ends of the reversing arms. The outline of the upper portion of the back, at *x*, Fig. 1, and at *y*, Fig. 2, on the side next to the occupants of the seat, is, it will be seen, of a concave form in both positions, and the lower portion at *y*, Fig. 1, and at *x*, Fig. 2, is convex, which form, as before indicated, is that which provides the most effective and easy support for the backs of the occupants. In order to preserve such form of the seat-back, relatively to the occupants, when the back is reversed or turned, which involves the relative transposition of its convex and concave portions, I provide mechanism for extending and depressing, respectively, different portions of the back, one form of which will now be described. The seat back may be upholstered with or without a series of spiral springs and elastic fibrous material in the usual way, or fibrous material alone may be used or the back may be used without elastic upholstery. As before stated, the outline only of the upholstery is shown, the springs and fibrous material not being represented. If springs are used, they are arranged to bear against the frame of the back which consists of a series of slats or boards 7, 8 and 9. Where upholstery is used, it is of the construction ordinarily employed in cushions for chairs and seats.

As represented in the drawings, the frame of the back consists of three sections 7, 7; 8, 8; and 9, 9, each of these sections being composed of two slats, which are connected to-

gether by cleats 7^a, 8^a and 9^a. The sections, which may each consist of a single slat or board if desired, are connected together by hinges 10, 10^a near each end. Those at the right hand end of the back in Fig. 3 being covered by the upholstery are not shown. Strips of webbing, canvas, or other flexible material, 16, are nailed or otherwise fastened to the slats 7, 8, and 8, 9, as shown in Fig. 4, and may, if desired, extend from top to bottom of the back. The material 16 is sewed to the covering x, y, of the upholstery, with strong twine 17, or the material and covering may be otherwise suitably connected together. When the flexible frame of the back is bent, the twine 17 holds the upholstery and its covering, so that the outline of the latter will approximate to the form which the frame assumes.

A metal plate 11, provided with pivots 12, 12^a, one at each of its ends, is attached to each end of the central section 8, 8, of the back frame, and the upper ends of the reversing arms 4 and 5 are connected to these pivots. Each of these arms has a small crank 13, 13^a, attached to its upper end, said crank turning about the pivot by which the arm is connected to the back. The cranks are provided with pins 14, 14^a at their outer ends, which pins work in slots 15, 15^a formed in plates attached to the upper and lower sections 7, 7, and 9, 9, respectively, of the seat back frame. In the reversal of the back, the ends of the arms 4 and 5, and the cranks 13 and 13^a, turn about one third of a revolution around the pivots 12 and 12^a. The paths in which the centers of the crank-pins 14 and 14^a travel are represented by the dotted arcs c, in Figs. 1 and 2. In Fig. 2, the small dotted circles at 12 and 12^a on the left hand side of the drawings indicate the positions of the pivots 12 and 12^a in Fig. 1. In reversing the back the centers of these pivots move in the arcs 12, d, 12 and 12^a, d, 12^a. In such movement, as already explained the crank-pins 14 and 14^a revolve around the pivots about one third of a revolution, as indicated by the arcs c. In moving from the position in which the back is shown in Fig. 1 to the opposite side of the seat, as shown in Fig. 2, the action of the crank-pins in the slots 15 and 15^a has the effect of turning the upper and lower sections 7, 7, and 9, 9, about the hinges 10, 10^a, as indicated by the arcs e and f. In the act of the reversal of the back from the position shown in Fig. 1 to that shown in Fig. 2, the section 7, 7, which is the upper one in Fig. 1 is moved away from the seat, and the lower section 9, 9, is moved toward it, so that, when the reversal is complete, these sections occupy the position shown in Fig. 2, from which it will be seen that the form of the upper part of the back, being, in its new position, the part y, is again concave, and the lower part, x in its new position, is convex. In other words, the form of the back is transposed by the act of reversal, and is the same relatively to the seat in both positions, that is, it is concave adjacent to its top and convex adjacent to its bottom. In other words, the upper part at x and y in Figs. 1 and 2, respectively, is concave in both positions, and the lower part at y and x, respectively, in said figures, is convex, the seat-back thus affording the support for the shoulder-blades and the lumbar regions of the back of the occupant, which is required for comfort. In addition to this advantage, the construction and operation are such as to cause the lower section 9, 9, in Fig. 1, and 7, 7, in Fig. 2, to be pushed forward toward the seat, giving more room at g and h, respectively, for the knees of persons who occupy the seat behind the one shown in the drawings.

Instead of employing a frame for the seat-back consisting of rigid sections connected together by hinges or articulations, as shown, the frame may, if desired, be formed of flexible material, so that its form can be changed by bending. Such a construction is shown in the sectional view, Fig. 5, in which the back is made flexible by the employment of springs 18, which are thin strips of metal screwed fast to a central slat 20, to which the pivot plates 11, before described, are fastened, the connection being made through a flange 19. The slats s, s, on each side of the central slat, are fastened to the springs 18, but are not attached directly to the pivot plates 11. It will be seen that a seat-back formed of springs and slats, as above described, may be operated by the mechanism shown in Figs. 1, 2 and 3, and that the action of the springs 18 will be similar to that of the hinges in permitting a change in the form of the back in and by its reversal.

The essential and characteristic feature of my present invention consists in the mechanism which is employed for effecting a change of form of the seat-back.

I do not wish to be understood as limiting my invention to seat-backs which are reversed by means of crossed reversing-arms, as the form of a seat-back having a flexible or articulated frame may be changed, in and by its reversal, by mechanism substantially similar to that herein described and shown, with any reversing-arms which are pivotally connected to the back, or have a rotary movement in relation to it during the act of its reversal.

I claim as my invention and desire to secure by Letters Patent:

1. The combination of a reversible seat-back provided with a flexible or articulated frame, reversing-arms pivotally connected to said back, and to fixed supports and cranks attached to said arms and coupled to the seat-back, whereby the form of the seat back is changed in and by its reversal, substantially as set forth.

2. The combination of a reversible seat-back provided with a flexible or articulated frame, crossed reversing arms connected to pivots attached to the middle portion of the seat back frame and to fixed supports, and cranks attached to the reversing arms and coupled to

parts of the seat back frame which have a capacity of movement independent of the portion to which the seat back pivots are attached, substantially as set forth.

3. The combination of a reversible seat-back provided with an articulated frame, crossed reversing arms connected to pivots attached to the central portion of said frame and to fixed supports, hinges connecting the upper and lower parts of said frame to its central part, said hinges being placed a shorter distance apart than the seat back pivots, and cranks attached to the reversing arms and coupled to the upper and lower sections of the seat back frame, substantially as set forth.

MATTHIAS N. FORNEY.

Witnesses:
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FRANK J. FRENCH.