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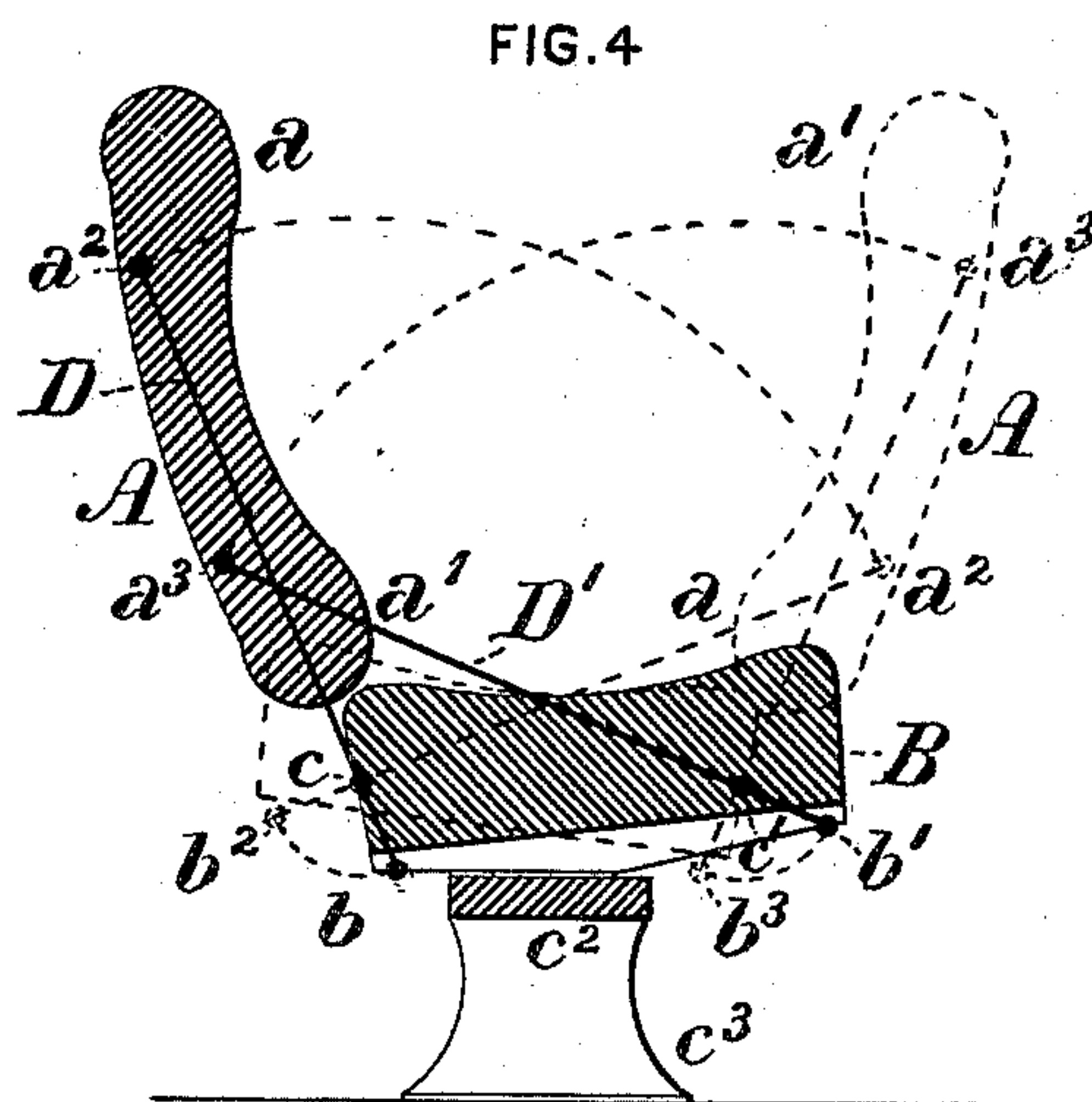
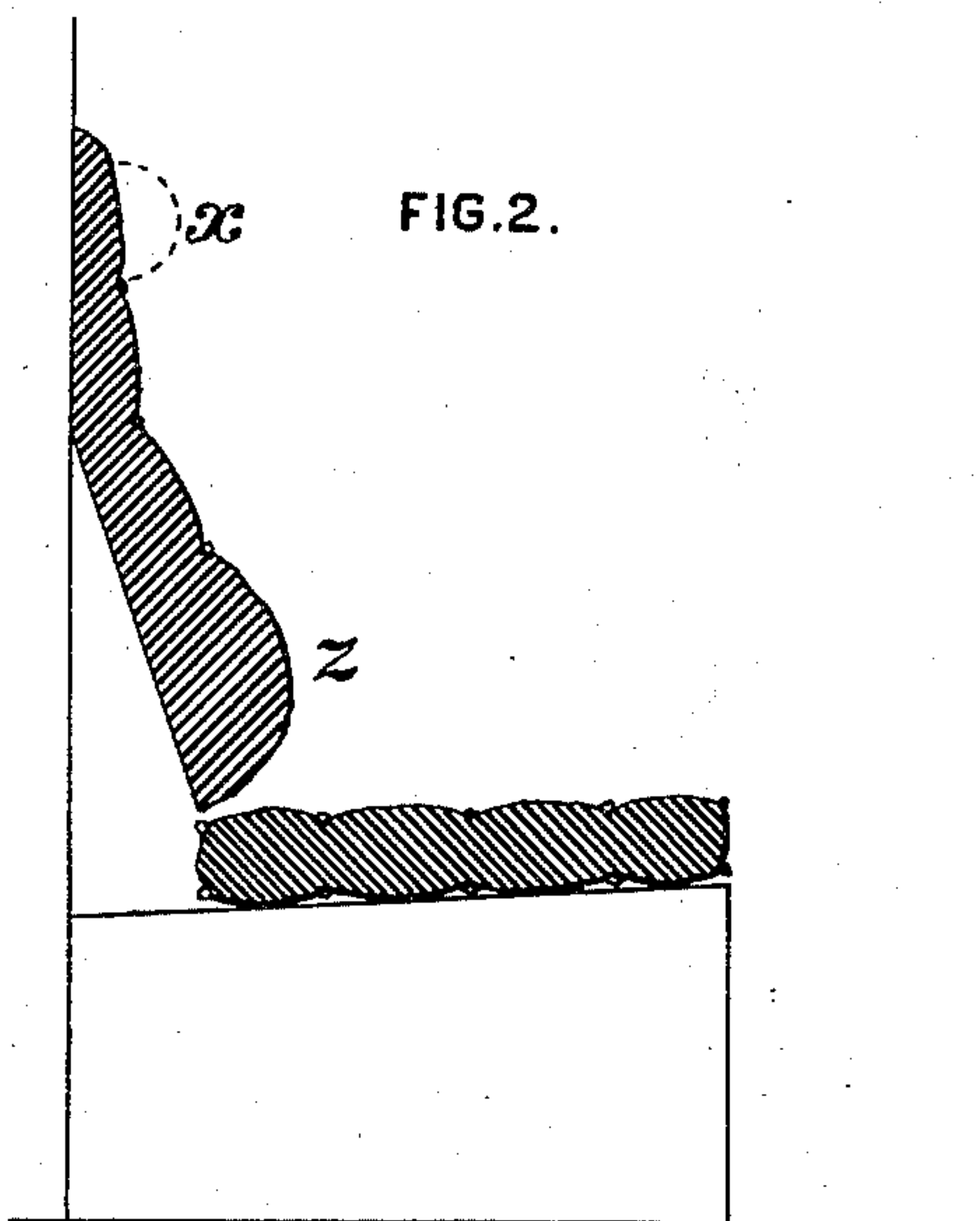
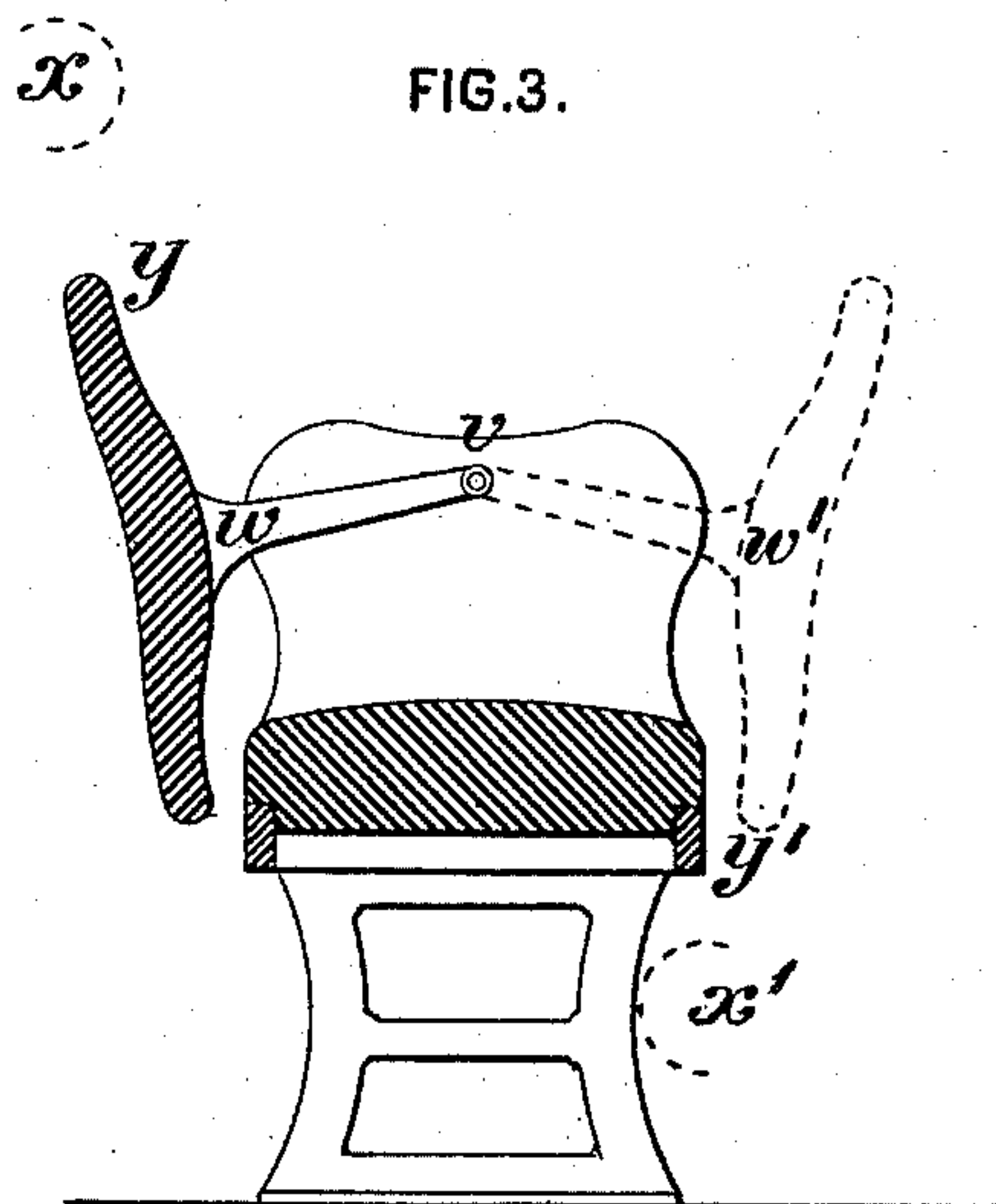
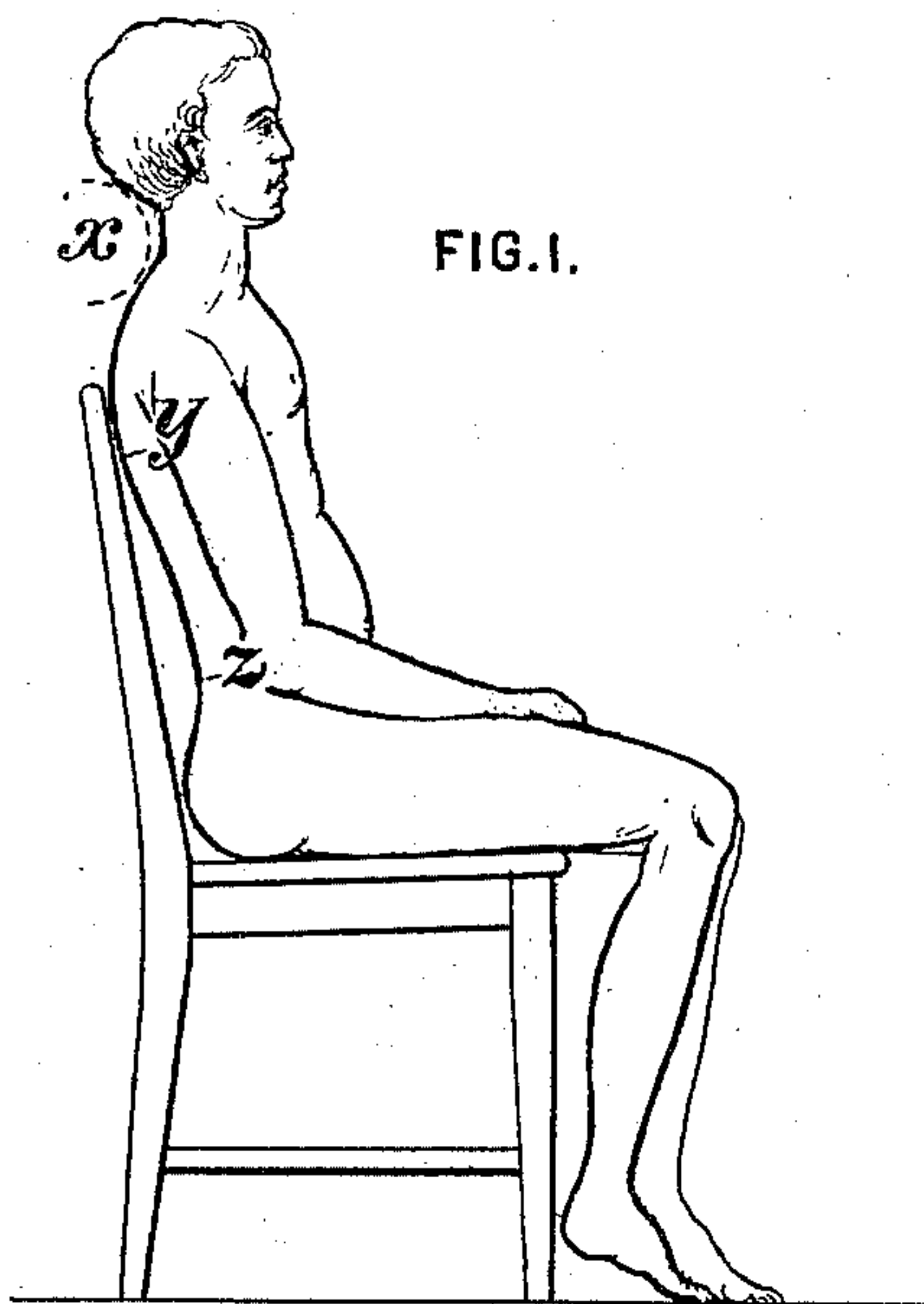
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M. N. FORNEY.

CAR SEAT.

No. 324,825.

Patented Aug. 25, 1885.



WITNESSES:

*Geo. D. Collier.*  
*Geo. F. Kelly.*

INVENTOR

*M. N. Forney.*  
*by Collier & Bell.*  
ATTORNEYS.

(No Model.)

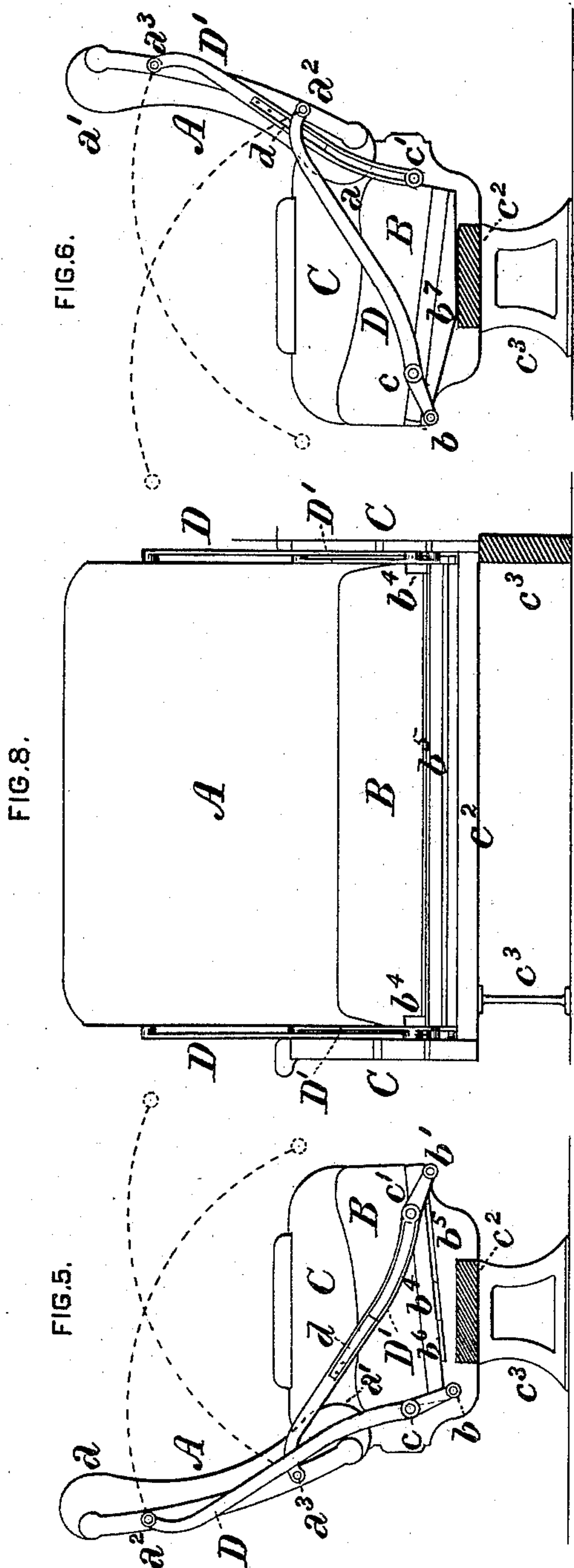
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M. N. FORNEY.

CAR SEAT.

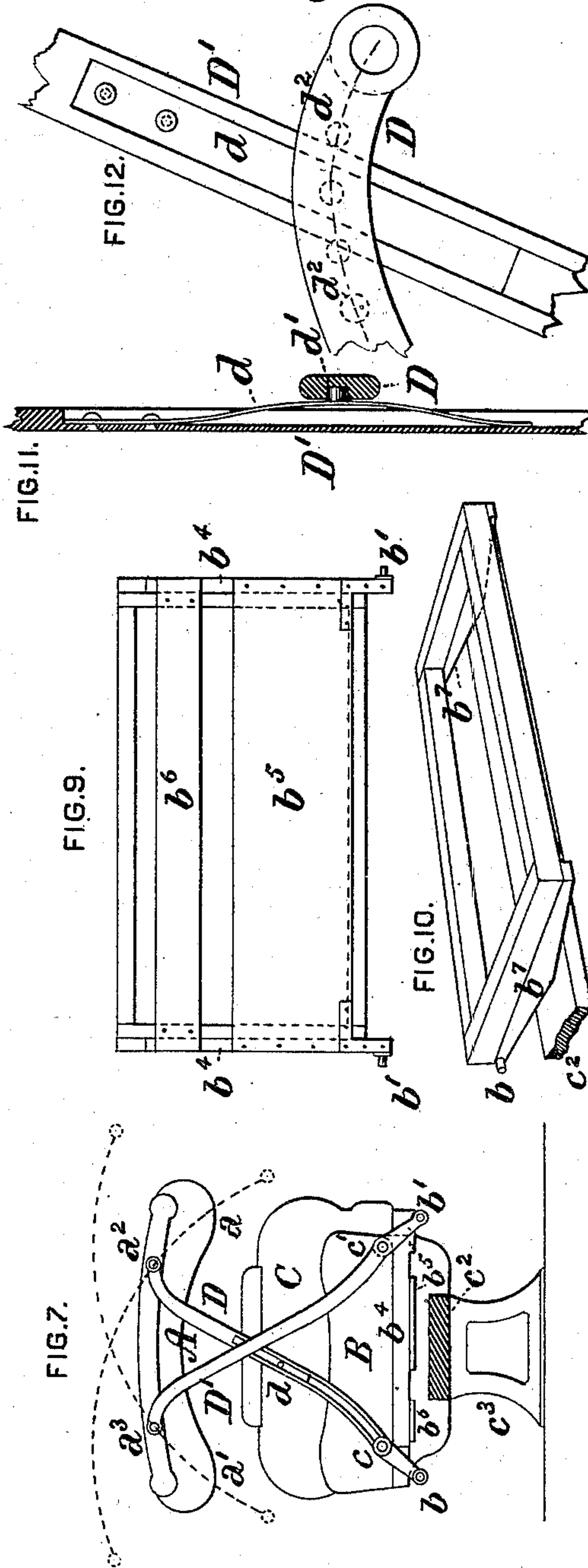
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# UNITED STATES PATENT OFFICE.

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

## CAR-SEAT.

SPECIFICATION forming part of Letters Patent No. 324,825, dated August 25, 1885.

Application filed March 2, 1883. (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 certain new and useful Improvements in Car-Seats, of which improvements the following is a specification.

The object of my invention, which relates to car-seats having reversible backs so as to be adapted to use in either direction in which the car may be moving, is to render seats of such character more convenient and comfortable to the occupant than heretofore; and to this end my improvements consist in certain novel devices and combinations hereinafter fully set forth.

It is a well-known fact that more or less muscular exertion is required to keep the human body in an erect position, whether a person be sitting or standing. The portions of the body which require the most exertion to keep erect when in a sitting posture are the neck and the loins, and in these the only bony supports consist of the cervical and the lumbar vertebrae, respectively. These are each articulated columns consisting of a number of superimposed bones, which are adapted to move or turn one upon the other, and are liable to lateral flexure unless restrained by muscular effort. The head being a heavy object requires considerable effort to keep it balanced, and consequently any support for it or for the neck is conducive to rest and comfort. Again, if the body is required to remain in a sitting posture for any great length of time, a support for the back in the lumbar region will afford relief to the muscles, which, without such support, would be more or less exerted to keep the vertebrae erect.

My invention is designed to provide a reversible back car-seat which shall afford suitable supports of the character above indicated, without involving the objections as to undue downward projection and interference with adjoining seats which have obtained in sundry constructions heretofore proposed, and have rendered them unsuitable for the requirements of practical railway service.

Under my invention the seat-back is so constructed and combined with reversing mechanism that its upper portion acts as a head-

rest and its lower as a support for the lumbar region of the back of the occupant, the seat being also rearwardly inclined, as is desirable, for comfort, especially in vehicles. The supporting functions of the upper and the lower portions of the back are exchanged relatively when reversed, and the seat is correspondingly inclined in reverse direction, as well as moved horizontally for such distance as is required to preserve its proper relation to the back and normal distance from the adjoining seat.

In the accompanying drawings, Figure 1 is a side view of an ordinary chair, illustrating, by reference to an outline of a sitting human figure, the points at which support is desirable; Fig. 2, a transverse section of a car-seat of the pattern used upon English railways, illustrating the provision of supports for the head and loins in connection with a fixed back; Fig. 3, a similar section of a reversible back car-seat of the ordinary American pattern; Fig. 4, a diagrammatic transverse section of a car-seat embodying my invention; Fig. 5, an end view of the same with the seat and arm removed and the seat-back turned to the left; Fig. 6, a similar view with the seat-back reversed; Fig. 7, a similar view with the seat-back turned half-way over; Fig. 8, a front view in elevation; Fig. 9, an inverted plan of the seat; Fig. 10, a view in perspective of a seat-frame and rockers; Fig. 11, a section on an enlarged scale through a pair of the seat-back arms or links, illustrating the relation of the spring thereto; and Fig. 12 a side view on a similar scale of the intersecting portions of a pair of the seat-back arms when in the position shown in Fig. 6.

Before proceeding to a structural description of my improvements a fuller explanation of the requirements which they are designed to meet may be obtained by reference to Figs. 1 to 3, inclusive.

By the relation of the rear outline of the human body to an ordinary chair, as illustrated in Fig. 1, it will be observed that in order to provide an effective support for the head and neck, and for the lumbar region of back, respectively, the seat-back must project at the portions *x* and *z* beyond the portion at *y* against which the shoulder-blades rest—



that is, a line touching the surfaces  $x$ ,  $y$ , and  $z$  would be concave toward the occupant of the seat. The propriety of such construction is recognized in the seats of English railway-carriages, as exemplified in Fig. 2. These have soft cushions, which project so as to support the back at  $z$ , and the upholstery is carried up to such a height that the head can rest against it at  $x$ . The seat-backs are, however, fixed and not reversible.

The ordinary form of car-seat which is used in the United States and is shown in Fig. 3, has its back made projecting toward the occupant at  $w$ , to afford, as far as may be, an easy lower support. In seats of this character, however, such projection must either be placed so high up as to fail to give support where it is most needed; or, on the other hand, the seat-back must be made very low, for the reason that the portion which is above the projection  $w$ , and which gives the required height when in the position shown in full lines will fall below the projection  $w$  when the seat-back is reversed, as shown in dotted lines. If the projection  $w$  is placed lower down, the distance  $w y$  must be greater for a given height of seat, and when the back is reversed it will extend downward a correspondingly greater distance, so that the upper (which then becomes the lower edge,  $y'$ , of the seat-back) will be in the way of the passengers in the next seat behind; further, if with the seat-back in the position represented in full lines a support for the head, as indicated by the dotted line  $x$ , should be placed at its top, such rest would, when the seat-back was reversed, assume the position  $x'$ , which is inconveniently near the floor. Again, if the support for the back should be placed in the lower portion of the seat-back and be arranged to act alternately as a head-rest and a back-rest, it would become necessary to raise the pivot  $v$  and the seat-back arm  $w v$  so high as to be in the way of the arms of the passengers. For the reasons above stated it has not hitherto been found practicable under the ordinary forms of construction of car-seats with reversible backs to provide easy and comfortable supports for the heads and the backs of the occupants of such seats. It should be further noted that a slight rearward inclination of a seat is found to add materially to its comfort, particularly in cars and other vehicles which are subject to jarring or jolting. In a seat thus inclined the effect of jolting is to settle the passenger backward in the seat, while without such inclination he tends to slide away from the back and off the seat. With reversible seat-backs the inclination of the seat requires to be changed with the turning of the back, and in reversing the back it is further desirable to move the seat horizontally in the reverse direction to that in which the seat-back is turned, so as to give greater room to passengers in the seat behind. My improvements provide, as will hereinafter appear, means for effecting such

movements of the seat simultaneously with the reversal of the back.

The construction and operation of a car-seat under my invention are illustrated in Figs. 4 to 11, inclusive. The seat-back A is shaped and upholstered so as to present a support,  $a$ , at top for the head and neck of the occupant, and a similar support,  $a'$ , at bottom for the occupant's back, and is symmetrical in form—that is to say, the supports  $a$  and  $a'$  correspond in size and shape—so that when reversed, as shown in dotted lines in Fig. 4 and in full lines in Fig. 6, the head-rest portion  $a$  serves to support the back, and the back-rest portion  $a'$  acts as a head-rest, the seat-back being moved into a position on the opposite side of the center line of the seat-frame at an angle to said line equal to that which it formerly occupied.

In order to enable the reversal of the seat-back to be so effected that its upper and lower portions shall assume the positions above indicated, and at the same time to impart the desired inclination and horizontal movement to the seat B, the seat-back A is coupled at each end by pivots  $a^2 a^3$  to the upper ends of two intersecting or crossed links or seat-back arms, D D', which are fitted, respectively, to vibrate upon fixed pivots  $c$  and  $c'$ , located in line horizontally upon the seat-arms C. The seat-arms are connected by a cross-piece,  $c^2$ , and are supported upon legs or standards  $c^3$ , fixed to the floor of the car. The seat B is supported by the links D D', to the lower ends of which it is coupled at each of its ends by pivots  $b b'$ . In reversing the seat-back (see Fig. 4) the pivot  $a^2$  moves in the arc  $a^2 a^2$ , and the pivot  $a^3$  in the arc  $a^3 a^3$ , the links D D' swinging upon the fixed pivots  $c$  and  $c'$ , respectively, as centers, and the seat-back assumes the reversed position shown by the dotted outline on the right. The lower movable pivots,  $b$  and  $b'$ , move in the short arcs  $b b^2$  and  $b' b^3$ , respectively, so that with the reversal of the seat-back the right-hand side of the seat is lowered and the left-hand side raised and the entire seat is moved horizontally toward the left, from the position shown in full section to that in dotted lines.

Inasmuch as the jar and motion of a car would be liable to cause rattling of the seat-arms if they come in contact at their points of intersection, which contact is necessary in order to afford sufficient lateral stability to the seat-back, proper provision should be made to prevent such rattling. Further, the ability to impart a greater or less degree of inclination to the seat-back at will, to accommodate the preferences of passengers in this respect is desirable. To these ends the seat-back arms D D' are each recessed to receive a spring,  $d$ , which is secured at one of its ends to the arm, and at the other or free end bears against the bottom of the recess, (see Figs. 11 and 12,) the spring being located in such position as to bear intermediately against the oth-



er arm of the pair, as they intersect when the seat-back is in position for use. A projection,  $d'$ , is formed upon the spring  $d$  at the point where the center lines of the arms D and D' intersect, and is adapted to engage any one of a series of correspondingly formed recesses,  $d^2$ , in the opposite arm. The pressure of the spring against the arms prevents them from rattling, and the engagement of its projection with one of the recesses exerts sufficient resistance to hold the back at any desired inclination, which may be readily varied as desired.

It will be observed that the movement of the links D D', Fig. 5, in connection with the seat-back A is such that the distance from center to center of the seat-pivots  $b$   $b'$  is greater when the parts are in the position shown in Fig. 7 than when the back is entirely turned over, as in Figs. 4 and 5. It is consequently necessary, if one of said pivots be rigidly attached to the seat, that the others should be adapted to move laterally relatively thereto. Instead, therefore, of attaching the pivot  $b'$  (and the corresponding pivot of the link at the other end of the seat) rigidly to the seat, said pivots are secured to sliding pieces  $b^4$ , which are fitted to move longitudinally in T-shaped grooves or channels at each end of and on the under side of the seat. The slides  $b^4$  are united by a board,  $b^5$ , Fig. 9, to the opposite ends of which they are screwed, and a board,  $b^6$ , fastened at its ends to the seat-frame prevents the vertical displacement of the slides from the grooves. The pivots  $b'$  are connected by L-shaped shanks to the sides and to the board  $b^5$ , as shown in Fig. 9.

In lieu of connecting both the links of each pair to the seat, as above set forth, the required horizontal and vertical traverse may be imparted to the seat by attaching thereto one link only of each pair, and supporting the seat by a short independent link suspended from the fixed pivot  $c'$  or by a double inclined rocker,  $b^7$ , (shown clearly in Fig. 10,) which rests upon the seat-rail or the stationary frame-piece  $c^2$ .

By connecting the arms D to the seat by the pivots  $b$  and detaching the pivots  $b'$  from the slides  $b^4$ , (see Fig. 6,) the seat will be moved horizontally and rocked vertically by the motion of the pivots  $b$  in the arcs  $b b^2$ , and it will be obvious that the prolongations  $c' b'$  of the arms D (shown in Figs. 5 and 7) and the pivots  $b'$  may be thus dispensed with.

As another means of effecting the same end one side of the seat might be supported upon an inclined plane formed upon the seat-rail or fixed support of the seat and the other side by the seat-back arms, which would impart longitudinal and vertical movement to the seat and give it the requisite inclination in one direction, the inclination when the back is reversed being obtained from the incline on the seat-rail.

In so far as relates to the rocker and inclined rail-supports hereinabove referred to, the same are included herein and made a part of the present invention as being suitable substitutes for, and by this description are, with the described connections, made mechanical equivalents of, the preferred construction of Figs. 5 and 7.

I am aware that a reversible seat-back operated by two pairs of intersecting or crossed links, as in the patent of Booth and Ripley, No. 8,508, November 11, 1851, is not new, and such, therefore, I do not broadly claim.

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

1. The combination, substantially as set forth, of a reversible seat-back provided with projections at or near its upper and lower sides, a seat-supporting frame, and pairs of intersecting or crossed links pivoted to the ends of said seat-back and to the seat-supporting frame.

2. The combination of a seat-supporting frame, a movable seat, a reversible seat-back, and pairs of intersecting or crossed links pivoted to said seat-back and to the supporting-frame, substantially as set forth.

3. The combination, substantially as set forth, of a seat-supporting frame, a reversible seat-back, intersecting or crossed links pivoted to said seat-back and to the supporting-frame, and a movable seat pivoted at each end to one or both of the adjacent links.

4. The combination, substantially as set forth, of a supporting-frame, a reversible seat-back, intersecting or crossed links which are pivoted at their upper ends to the seat-back and are supported upon fixed pivots between their ends, and a seat connected to the lower extensions of said links below their fixed pivotal points.

5. The combination, substantially as set forth, of a supporting-frame, a reversible seat-back, and a pair of intersecting or crossed links, each link provided with a spring, as and for the purpose described.

6. The combination, substantially as set forth, of a seat-supporting frame, a reversible seat-back, two pairs of intersecting or crossed links pivoted to said back and to the supporting-frame, and an extensible frame, one portion of which is pivoted to one pair of said links and the other portion pivoted to the opposite pair of links, said frame being constructed substantially as described, whereby its two portions may slide one upon the other, as and for the purpose specified.

MATTHIAS N. FORNEY.

Witnesses:

J. SNOWDEN BELL,  
O. BAUMANN.