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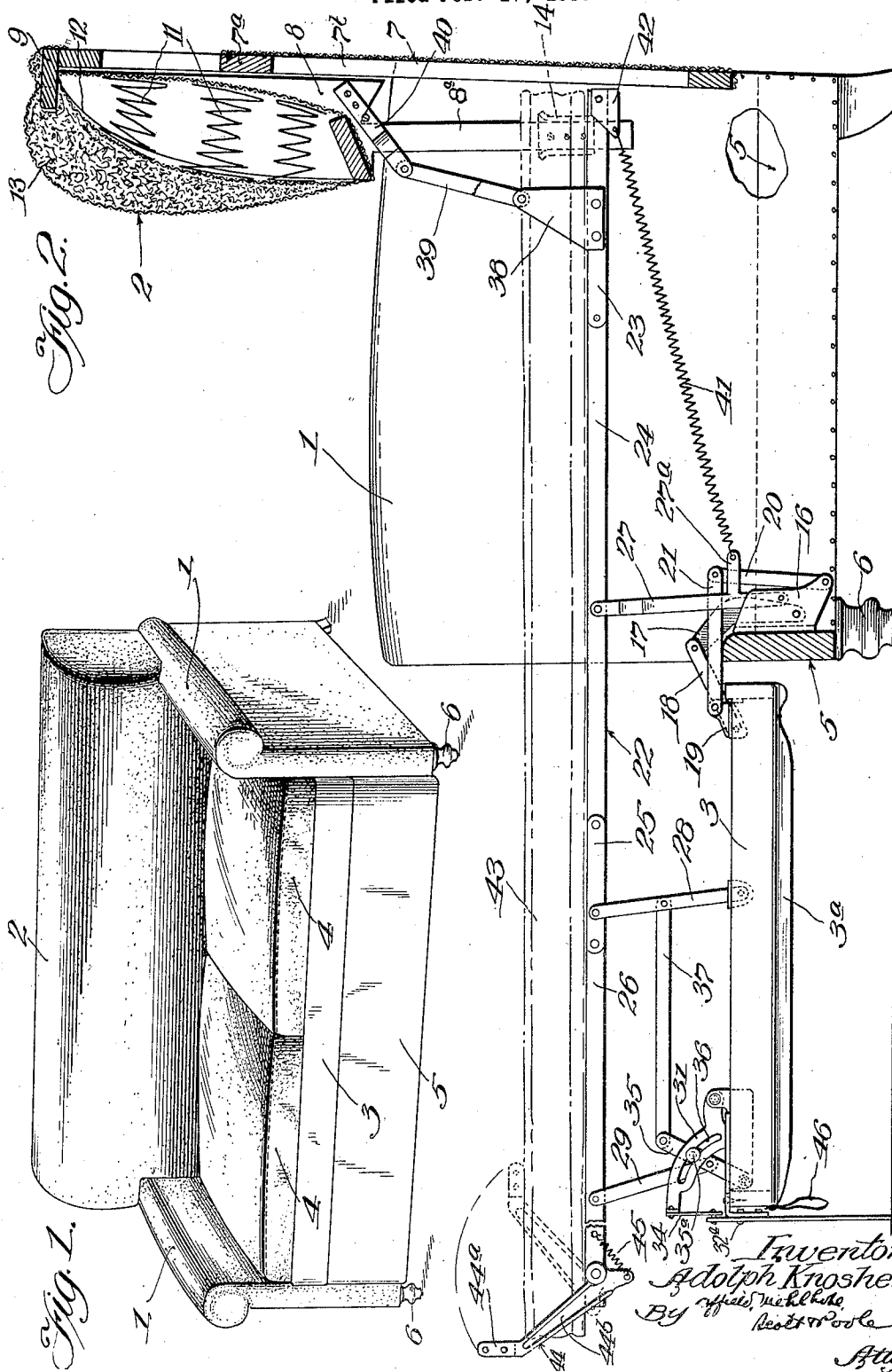
A. KNOSHER

1,805,097

DAVENPORT BED

Filed Feb. 17, 1930

3 Sheets-Sheet 1



May 12, 1931.

A. KNOSHER

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Fig. 3.

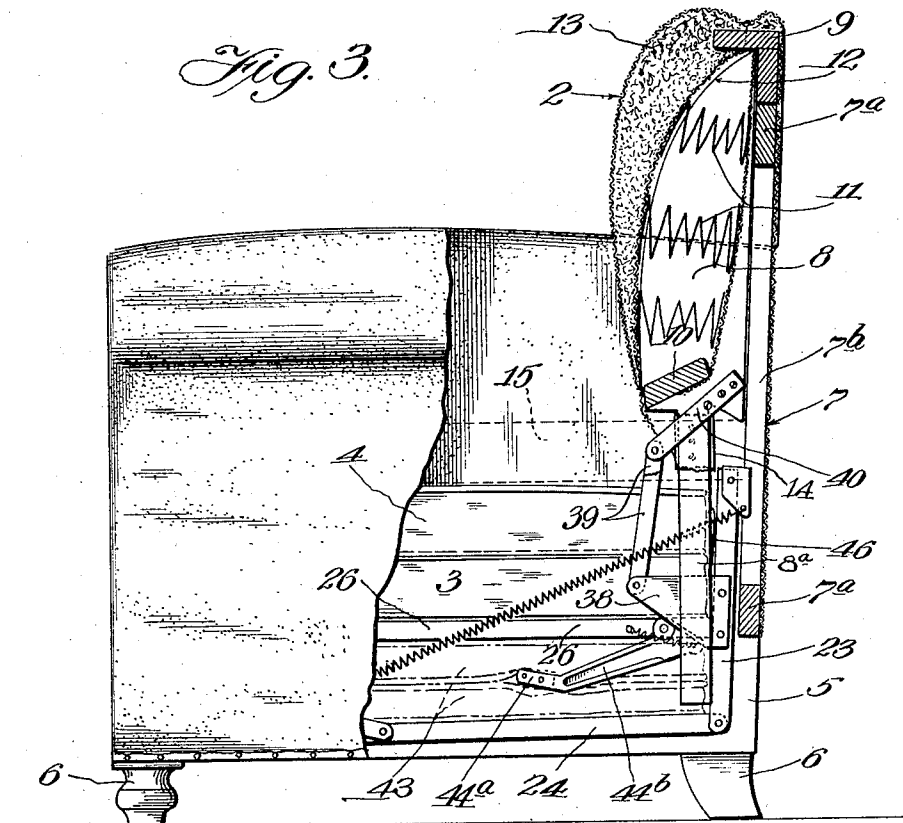
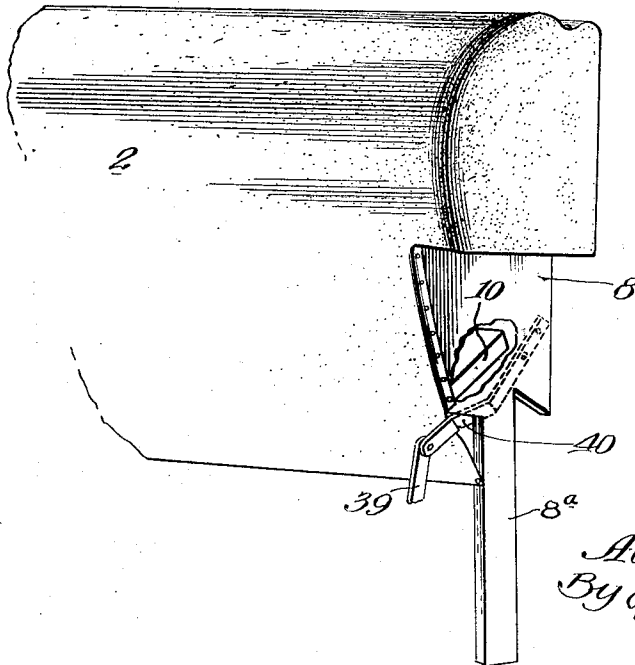


Fig. 4.

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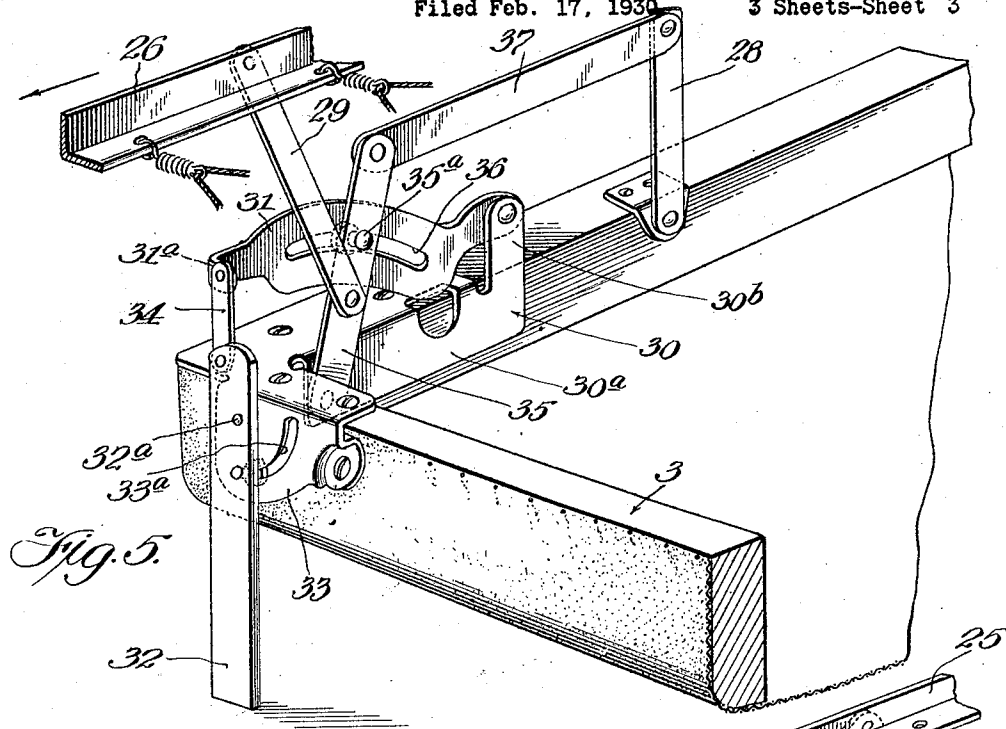
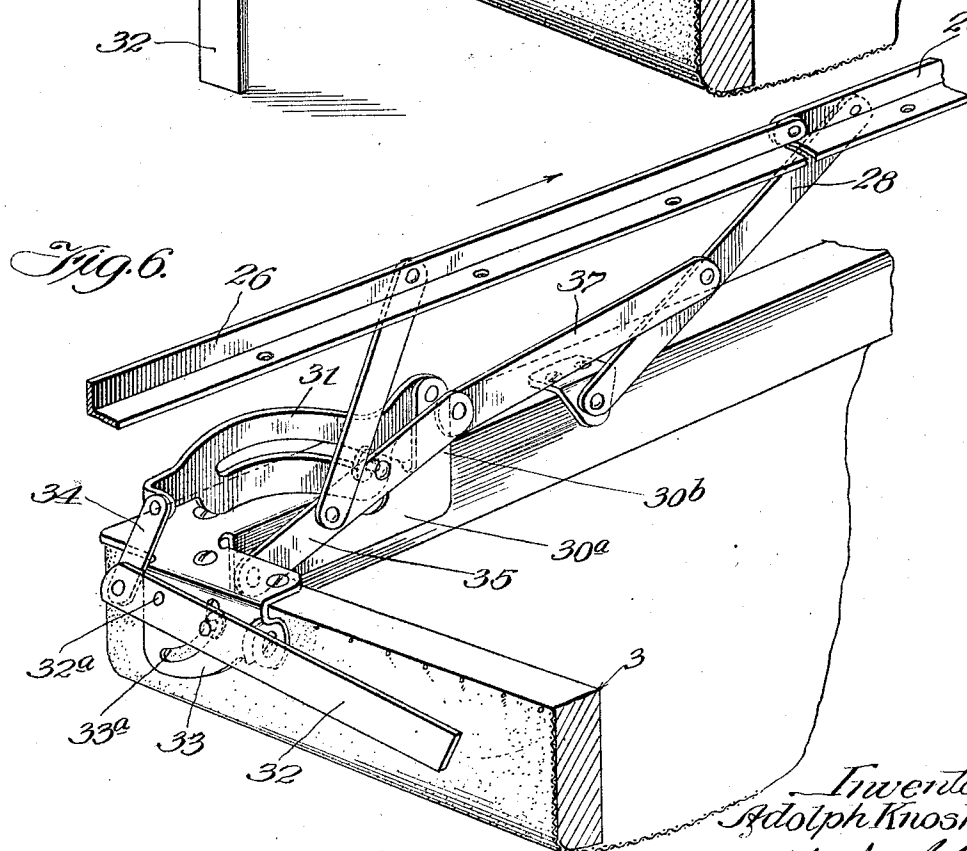
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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DAVENPORT BED

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This invention relates to improvements in davenport beds, and more particularly to davenports capable of being converted into a bed by swinging the seat outwardly and downwardly, thereby extending a foldable bed frame which is enclosed within the box-like base of the davenport when made up for day use.

The davenport bed of the present disclosure is typical of the style in which the bed is arranged at right angles to the back of the davenport with the head at the outer end, and in order to obtain full bed length and yet maintain a compact construction it has been the practice to lift or remove the back rest so as to utilize the available space for the foot of the bed. Heretofore it has been necessary to raise the back rest bodily by hand and independently of the bed extending operation, and hence involved considerable physical exertion, although it was possible to decrease the weight of the back rest by using lighter springs and upholstery.

The object of the present invention is primarily that of providing a construction in which the back rest is raised and lowered automatically with the extension and folding of the bed frame, thereby eliminating the additional effort and often laborious task of lifting the same by hand. And secondarily it has made possible the use of a more substantial back rest construction including deeper springs and thicker upholstery inasmuch as the added weight is no longer an appreciable factor in the manipulation of the bed.

The foregoing, together with other improved features of construction, are fully disclosed in the accompanying drawings, in which

Figure 1 is a perspective view of a davenport bed embodying my invention.

Figure 2 is a view in longitudinal section through the davenport extended for use as a bed.

Figure 3 is a view partially in side elevation and partially in vertical section showing the davenport arranged for day use.

Figure 4 is a perspective view of one end of the back-rest removed.

Figure 5 is an enlarged perspective view of a portion of the outer end of the seat and bed frame in extended position, and

Figure 6 is a similar view of the same parts shown in Figure 5 in partially folded position.

As shown in Figure 1, the davenport bed in its outward appearance is typical of furniture of this class, namely, an elongated sofa with side arms 1, 1, back-rest 2, and seat, the latter preferably consisting of a covered seat frame 3 and two removable seat cushions 4, 4.

As is customary in furniture construction, the davenport frame is of wood, the members being assembled in skeleton form and then covered or upholstered in the usual manner, with certain portions built up with padding and backed by springs, as in the case of the back-rest.

Without going into detail as to the frame construction, it consists generally of a rectangular base frame 5 extending around the bottom with the short legs 6 secured at each corner. At each end of the base frame are end frames not shown in full, but on which are built up the side arms 1, 1. A back frame 7 made up of top and bottom rails 7a, 7a, and side rails 7b, projects a short distance above the side arms 1, 1 and completes the stationary frame work of the structure.

The back-rest 2, although supported by the back frame 7, is a separate structure and movable relative thereto in a vertical direction. Thus as shown in Figures 3 and 4 the back-rest is also an upholstered frame made up of vertical end frame members 8, 8, a top rail 9 of inverted L-section and a lower rail 10 inclined slightly upwardly from front to back and extending horizontally between the end members. The lower rail 10 is located substantially midway the upper and lower ends of the side members and marks the lower extremity of the upholstering, which consists of a backing of coil springs 11 enclosed within a fabric casing 12 tapering to a point at the apex of the L-shaped top rail and having the fabric tacked at its lower edges to the edges of the lower rail 10.

Over the spring foundation is a padded cushion 13, thicker at the top, giving the back rest a rounded or convex contour.

The side frame members 8 of the back-rest are cut to the general cross-sectional contour of the upholstering throughout its upper half, but with its straight rear edge extending slightly to rear and bearing flush against the almost vertical back frame 7. Extending vertically downward from the upper portion of each side frame member 8 from a point just below the lower rail 10 is a narrow rail or extension 8a terminating just above the bottom edge of the bottom frame 5, and lying inwardly from the ends thereof, it being noted from Figure 4 that the upper upholstered end portions of the back-rest 2 are extended outwardly beyond the end frame members 8, 8 to provide extensions which over-lie the rear ends of the arm rests 1, 1 as shown in Figure 1.

These vertical extensions or rails 8a at each end of the back-rest have sliding connection with a pair of inwardly facing guide members 14, 14 which have the form of metal channel plates flanged at the longitudinal edges and screwed to the inside faces of the horizontal side frame members of the davenport frame, these members 15 extending horizontally from front to rear just below the lower rail 10 of the back-rest 2 (Figure 3). Thus in the lowered or normal position of the back-rest it is supported by the back frame 7 with the top rail 9 of the former resting on the top rail of the latter, and the channel plates 14, 14 in sliding engagement with the upper end portions of the extensions 8a, 8a. The means for effecting raising and lowering of the back-rest will be presently described.

Referring now to the extensible seat and bed frames, Figures 2 and 3, the former, already identified as a rectangular covered frame, is suitably padded on its top surface as at 3a to provide a resilient supporting surface for the cushions 4, 4. In the normal position as shown in Figures 1 and 3, the seat frame extends the full width of the base frame 5, with its front frame member resting edgewise upon the front member of said base frame, and having hinged connection therewith by an arrangement of links and levers at either end; each consists of the following parts: On the inside face of the front frame member 5a of the base frame is fixed a bracket 16 having an inwardly projecting web to which is pivotally connected the end of a lever 17, having somewhat the shape of a bell crank lever, and having its outer end connected with one end of another lever 18 pivotally connected with a bracket 19 secured to the inside bottom edge of the seat frame just inwardly from its front edge, Figure 2. Also pivotally connected with the bracket 16 is a

straight lever 20 connected at its one end with another lever 21, also having pivotal connection with the bracket 19 on the seat frame. Thus the seat frame is hinged to the base frame by two pairs of levers at each end, each pair varying in length and with their points of attachment with the brackets 16 and 19 offset from each other so as to control the movement of the seat frame as it is being swung from closed to extended position. As shown in Figure 2, the seat frame 3 after it has been extended, occupies a horizontal reversed position in front of the base frame 5, with its front edge spaced a few inches therefrom. In short, the arrangement of levers permits the seat frame to swing through 180 degrees, at the same time throwing it outwardly from the base frame, thereby adding several inches to the length of the bed frame supporting structure.

The bed frame 22 in the extended position shown in Figure 2 is elevated a foot or so above the seat and base frames, and is supported thereby through a series of levers presently to be described, whereas the outer end of the seat frame is supported by folding legs which also will be described in due course.

Referring to the bed frame, the same consists of longitudinal and transverse metal frame members of angle sections supporting a yieldable lattice or net work of wire or metal strips, after the manner of the ordinary bed or cot frame. The extended frame is full bed length and the width equal to the width of the davenport.

As already indicated, the bed frame is foldable lengthwise from its extended position in which its head end projects beyond the outer end of the extended seat frame to something less than one-half its length, that is, the width of the space within the base frame 5 into which it is folded when the davenport is made up for day use. Thus the longitudinal frame members of the bed frame are divided into four hinged sections from foot to head, namely, a short section 23 hinged at its free end to the horizontal side frame member 15 adjacent the back of the davenport, a long section 24, another short section 25 and a second long section 26 at the head end, the several sections on each side being pivotally connected together at their ends through the medium of overlapping extended ears at the ends of the vertical webs of the sections, as shown in Figure 6, thus bringing the ends of the horizontal webs into abutting contact when the sections are flexed to a straight line position. The short as well as the long sections differ in length; the section 23 at the foot being slightly longer than the intermediate short section 25, and the long section between the two short ones being longer than the section

26 at the head or outer end of the bed frame. The reason for these differences in length of sections is necessary to permit the bed frame to fold properly within the space at the bottom of the davenport frame, as will presently be shown.

The bed frame is supported by three sets of levers arranged in pairs along the opposite longitudinal and sectional frame members, one pair 27 being pivotally connected with the bracket 16 at the front of the base frame and connected with the sections 24 at a distance inwardly from their outer ends so that they stand in substantially vertical position when the bed frame is extended; a second pair of levers 28 are connected with the seat frame substantially midway of its sides and are connected with the intermediate short section 25 near its outer end so that the links stand upright and incline outwardly slightly; and finally a third pair of levers 29 pivotally connected with the outer bed frame sections 26 just inwardly from the head end, and stand substantially parallel with the intermediate pair of levers 28. The outer pair of links, however, are not connected directly with the outer end of the seat frame 3, but indirectly through an intermediate assembly of links which include the drop legs for said seat frame. This linkage is clearly shown in Figures 5 and 6, and will now be described:

At each outer corner of the seat frame 3 and secured to the faces of the frame members thereof is an L-shaped plate 30 which in the extended and reversed position of the seat frame faces upwardly. The plate is provided with an angular web 30a lying against the inside face of the end member of the seat frame and at its end is an upright ear 30b to which one end of a curved slotted lever 31 is pivoted, this lever extending outwardly toward the front edge of the seat frame where it terminates in an ear 31a bent inwardly at right angles and above the upper end of a leg bar 32 pivotally mounted at 32a to the face of a web 33 integral with the corner plate 30 and spaced a short distance away from the vertical front edge of the seat frame, said web having an arcuate slot 33a of 90° concentric with the pivot pin 32a. The upper end of the leg bar 32 is connected with the ear 31a of the curved lever 31 by a short link 34, these parts all swinging in vertical planes so that movement imparted to the curved link swings the leg bar from a vertical supporting position in contact with the floor (Figure 5) to a horizontal position along the edge of the seat frame (Figure 6), the latter position being assumed when the seat frame is closed, so that the leg is concealed.

Pivotally connected to the vertical web 30a of the corner plate 30 near its outer corner is a lever 35 lying inside of the

curved lever 31 and carrying at a point inwardly from its free ends a stud 35a which engages and slides in a curvilinear slot 36 in the curved lever 31. The outer end of the lever 35 is pivotally connected with a cross link 37, which extends in a general horizontal direction toward the supporting lever 28 located inwardly from the end of the bed frame and is pivotally connected with the same substantially midway of its ends. And finally the outer frame supporting lever 29 heretofore identified as pivotally connected near the end of the bed frame is pivotally connected at its lower end with the lever 35 substantially midway of its ends. The action of this arrangement of levers and links will be explained later in connection with the folding and extension of the bed frame.

As previously pointed out, the back-rest 2 is connected with the bed frame and slides upwardly and downwardly as the latter is extended and folded. As shown in Figures 2 and 3, this connection is specifically between each side frame member 8 of the back-rest and the adjacent inner end sections 23 of the bed frame, the latter having a triangular shaped plate 38 fixed thereto and extending at right angles to provide an arm to the end of which is pivotally connected one end of a connecting link 39, the other end being connected with the end of a strap 40 fixed to the inner face of side frame member 8 just below the rail 10.

To complete the essential parts of the assembly, a pair of long coil springs 41, 41 extend from the inner corners of the bed frame downwardly along the sides of the davenport end frames to the first pair of supporting levers 27 for the bed frame. For attaching the ends of the springs to these parts, a plate 42 is fixed to the extreme ends of the bed frame sections 23, and the levers 27 provided with short arms 27a near their points of pivotal connection with the brackets 16, said plates 42 and arms 27a having holes punched therein through which the ends of the springs are hooked. These springs are normally under tension, but are elongated when the bed frame is extended from folded position and thus oppose the unfolding or extension of the bed frame and assist in the folding thereof.

Supported upon the bed frame is a mattress 43 of standard quality and thickness and of the same dimensions as the bed frame. At the outer end of the bed frame is a pillow rest or adjustable head board 44, consisting of a flat cross bar 44a extending between the ends of a pair of lever arms 44b pivotally mounted on opposite sides of the bed frame and on the outer faces of the sections 26, 26. A spring 45 connecting the lower end of each lever with the bed frame serves to hold the head board in raised posi-

tion just beyond and above the outer end of the mattress. This head board is adapted to be swung inwardly and upon the mattress when the bed frame is about to be folded, thus aiding in holding the mattress in place.

A clear idea of the position of the several moving parts of the assembly in folded and extended position as well as their path of movement will be had from a comparison of Figures 2 and 3 and Figures 5 and 6. Figure 3 shows the parts before the bed is extended and the davenport made up for day use. It is first to be observed that the back-rest 2 is in its lowered position with its top rail 9 resting upon the upper rail 7a of the back frame 7, and, secondly, that the bed frame is folded back upon itself, with the several hinged sections constituting the side frames arranged in the general form of a hollow rectangle, that is, the inner or foot section 23 is dropped to a vertical position, the two longer sections 24 and 26 extending horizontally in parallel spaced relation with the shortest section 25 extending crosswise of their ends. The mattress 43 is folded double and lies within the space formed by the bed frame sections, while the seat frame rests on the folded bed frame and the cushions 4 upon the seat frame.

To convert the davenport into a bed the cushions 4 are removed, and by grasping a loop 46 attached to the rear edge of the seat frame and pulling forwardly, said frame is swung upwardly and forwardly by the levers 27. Simultaneously with the movement of the seat frame the bed frame begins to unfold accompanied by a combined endwise shifting and lifting movement as the sets of levers 27, 28 and 29 supporting the bed frame flex the sections thereof into a straightened position, the inner sections 23 alone remaining in the same relative locations except for swinging through a 90° angle from vertical to horizontal position as their outer ends are shifted with the parallel movement of the sections 24. These inner end sections 23 being connected with the vertically sliding back-rest through the arm 38 and link 39, slides the latter bodily along the back frame 7 so that its lower end is lifted well above the level of the mattress 43, thus permitting the space occupied by the back-rest to be utilized and extending the bed to the back frame.

When the seat frame 3 has been swung upwardly into an upright position, the grasp is then shifted from the loop 46 to the outer edge of the bed frame and from that point on the effort is exerted in a forward pull until the bed frame reaches its fully extended position as shown in Figure 2. It is not thought necessary to trace the swinging movement of the several groups of links and levers, inasmuch as they swing upwardly and downwardly with the seat and bed

frames, their length and points of connection determining the path and final relative positions of the several parts. The linkage connecting the outer ends of the frames, however, may require explanation as to the manner in which the leg-bars 32 are dropped to support the extended structure:

As the seat frame approaches its extended horizontal position in its outwardly swinging movement, the end frame is moving relative thereto in an upward and outwardly direction as already explained, and hence the levers 28 and 29 between the bed and seat frames swing outwardly from a substantially horizontal position to a vertical position between the two frames as shown in Figure 5. Thus lever 28 swings in a counterclockwise direction (to the left) shifting the cross link 37 in the same direction which in turn rocks the intermediate lever 35 toward a vertical position, and sliding the stud 35a along the slot 36 in the curved lever 31, thereby lifting its outer end to lower the leg-bar 32 into vertical position through the short connecting link 34. In the meantime the lever 29 connected with the outer end of the bed frame and with the intermediate link, acts as a toggle in the flexing of the links to lift and support the bed frame in its horizontal position.

It must be explained in connection with Figure 6 (intended to disclose the action of the same linkage in lifting the leg-bars as the bed frame is being folded), that it is not true representation of the relative positions of the parts since it is obvious that there can be no movement of the bed frame or intermediate levers unless there is movement of the seat frame. In short, the relative positions of the parts as shown would occur as the seat frame is being swung over into closed position and not in fully extended position, and hence the seat frame is not in the same position as in Figure 5, but in reality should be reversed. But owing to the difficulty of clear illustration, the same perspective has been used but with the bed frame and levers shifted relative to the seat. Thus in the operation of folding the bed frame the levers swing toward a horizontal position and to the right, the curved link being depressed by the movement of the stud 35a to the far end of the slot 36, this causing the leg-bar 32 to be swung upwardly into horizontal position along the rear edge of the seat frame and which in the closed position of the davenport is entirely concealed.

From the foregoing, it will be seen that the present davenport bed construction unites all of the moving parts in such a manner that they shift together into their proper positions under physical effort applied at one point, and further that advantage has been taken of leverage in the design

of the connecting linkages in order to reduce the exertion of operation to a minimum.

I claim as my invention:

1. A davenport bed comprising a main frame including stationary base and back frames, a seat frame hinged to said base frame, an extensible bed frame consisting of pivotally connected sections, levers connecting said bed frame sections with said base and seat frames whereby the same are simultaneously elevated and extended in the swinging of said seat frame into open position, a back-rest consisting of a frame bearing against said back frame and having rails extending downwardly adjacent each end thereof and slidably mounted in stationary guides on said main frame, and links operatively connecting the adjacent bed section with said back-rest at points adjacent the upper portion of said rails, whereby the latter is raised and lowered with the movement of said bed section to and from extended position.

2. A davenport bed comprising a main frame having stationary base, side and back frames, a seat frame hinged to said base member, an extensible bed frame consisting of hinged sections, one of the same being pivotally connected to said main frame adjacent the back frame member, levers connecting the other sections of said bed frame with said seat and base frames, whereby the same are elevated and moved into horizontally extended position by the swinging of said seat frame, a back-rest including a frame bearing against said back frame and having rails extending downwardly at opposite ends thereof, channel-shaped guide members fixed to the side frames and engaged by said rails, and links connecting said first-mentioned pivoted bed frame section with said back-rest adjacent the upper ends of the rails thereof, and operative to raise and lower said back-rest in the pivotal movement of said bed frame section to and from horizontally extended position.

Signed at Naperville, Ill., this 14th day of February, 1930.

ADOLPH KNOSHER.