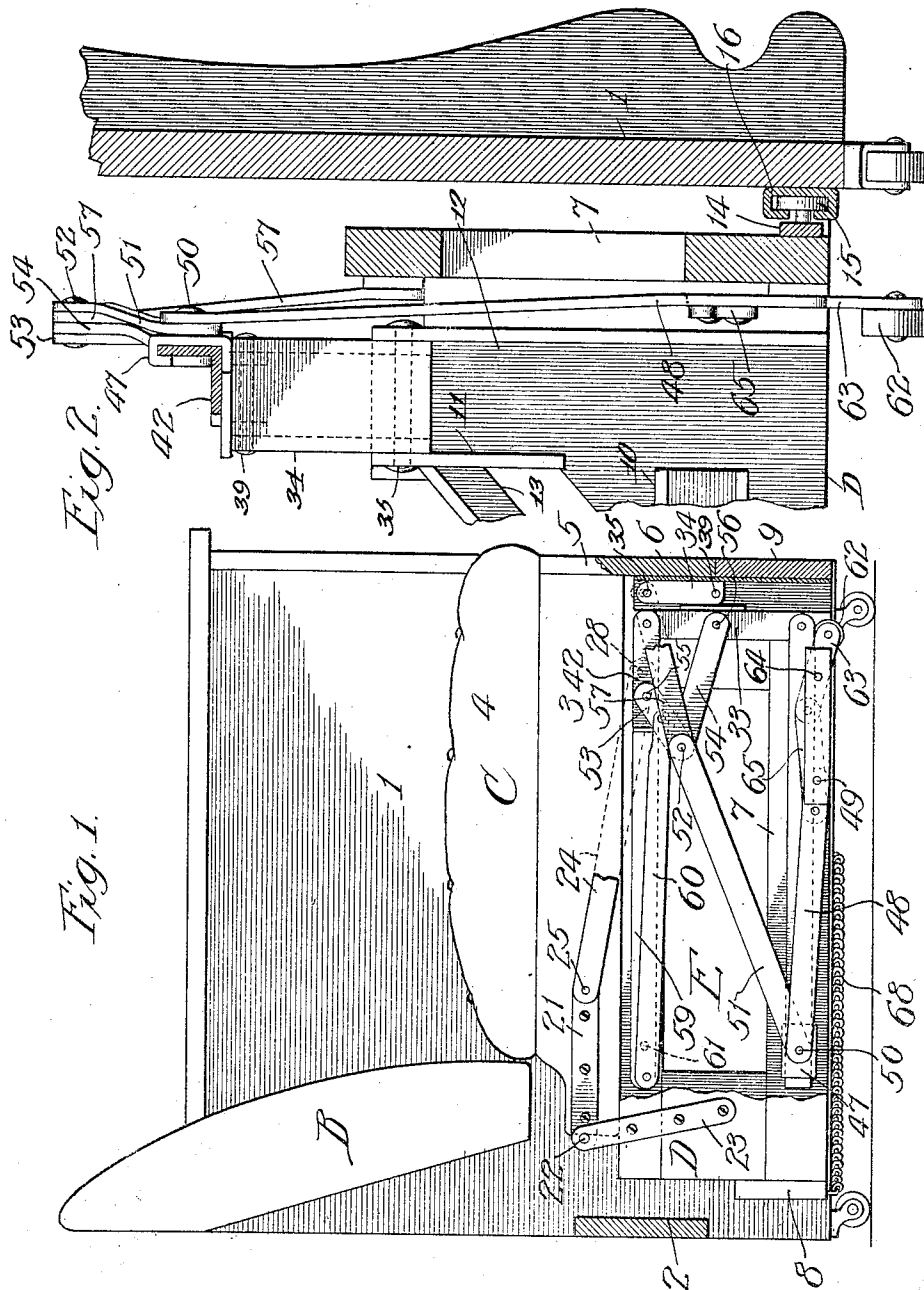


SOFA BED.

1,012,861.

Patented Dec. 26, 1911.

4 SHEETS—SHEET 1.



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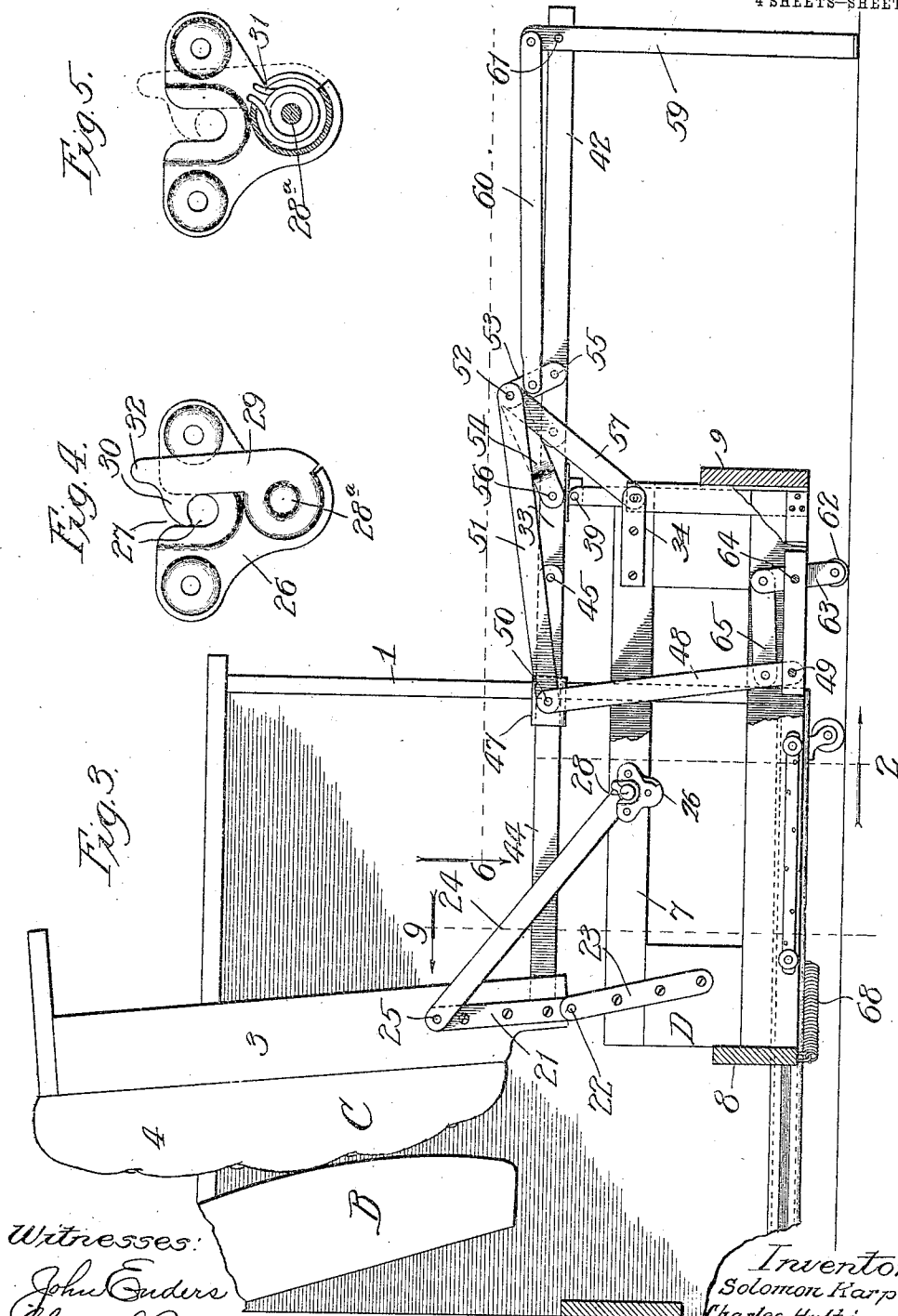
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1,012,861.

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4 SHEETS-SHEET 2.



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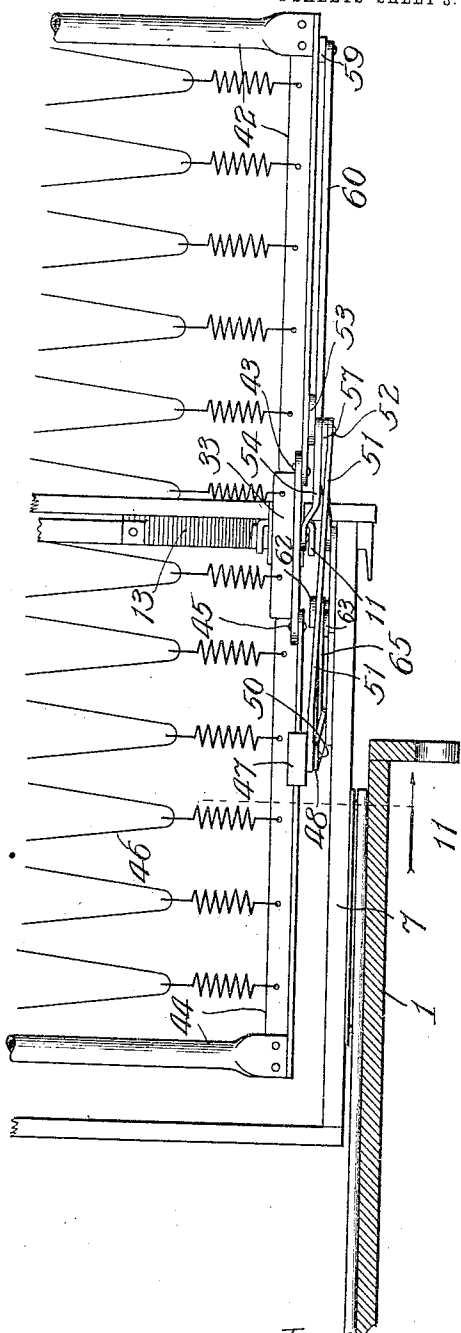
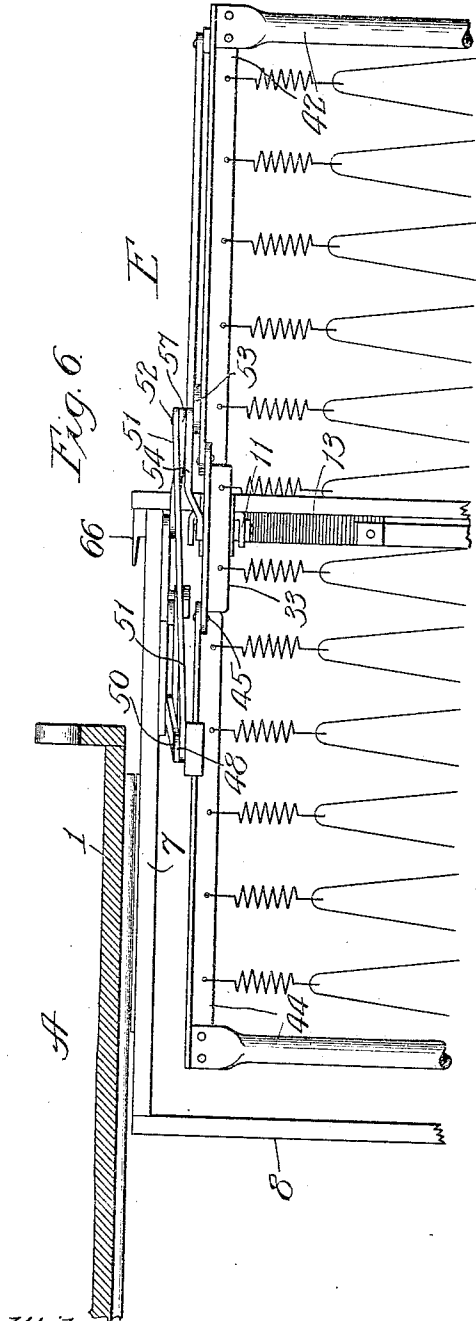
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SOFA BED.

APPLICATION FILED JAN. 15, 1910.

1,012,861.

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4 SHEETS—SHEET 3.



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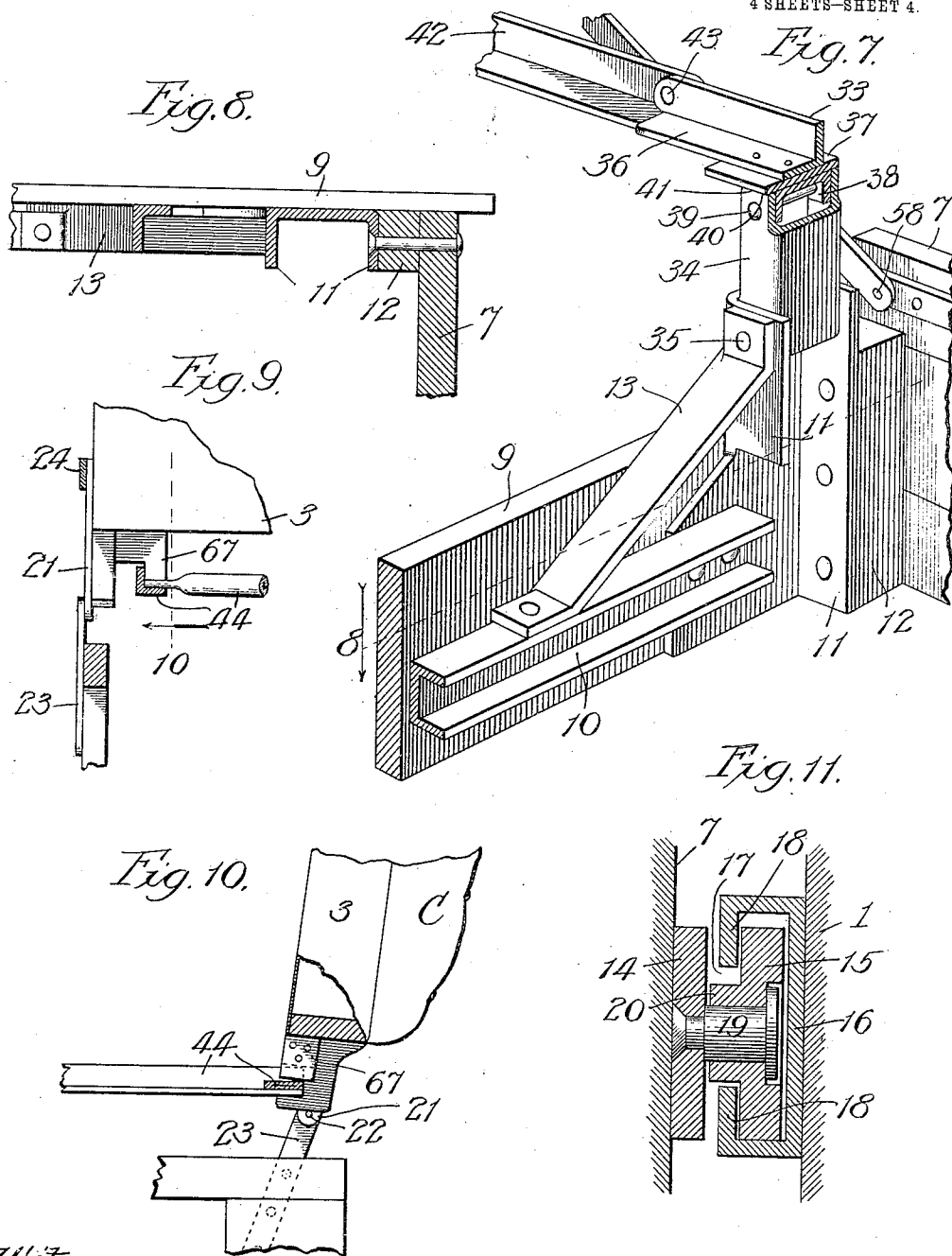
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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SOFA-BED.

1,012,861.

Specification of Letters Patent.

Patented Dec. 26, 1911.

Application filed January 15, 1910. Serial No. 538,194.

To all whom it may concern:

Be it known that we, SOLOMON KARPEN and CHARLES HULTGREN, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Sofa-Beds, of which the following is a specification.

Our invention relates particularly to combination sofas and beds, or combination couches and beds, in which a foldable mattress-frame, or foldable bed-frame, is normally housed within the main frame beneath the seat of the sofa and equipped with a foldable wire mattress, or spring bed-bottom, the parts being so related as to afford room between the sections of the folded bed frame and bottom for the bedding, *i. e.*, the mattress pad, bed linen and covers.

The present invention constitutes an improvement on the construction shown in Karpen application No. 485,973, filed March 26, 1909; and our primary object is to provide an improved construction of the character indicated wherein provision is made for disposing the bed, when the structure is converted to bed form, in a higher plane than has been feasible in our prior constructions, and to accomplish said purpose without unnecessary complications, and without interfering with the compactness of the structure in its folded condition, ease of manipulation and durability of structure being also kept in mind as of prime importance.

It may be preliminarily stated that in the preferred construction of the invention as illustrated in the accompanying drawings, there are employed: a main frame; a stationary back carried thereby; a rearwardly swinging seat adapted to assume a standing position adjacent said back; a forwardly shiftable carriage located in said frame; and a folded bed mounted on said carriage and normally housed beneath said seat in the folded condition of the sofa-bed, said folded bed comprising an intermediate bed-section foldably mounted on the front upper portion of said carriage, and front and rear bed-sections foldably connected with said intermediate section. In the con-

struction illustrated, the rearwardly swinging seat and forwardly shiftable carriage are so connected with each other and with the main frame that the carriage will be shifted forwardly when the seat is swung rearwardly to the standing position; and the bed may then be unfolded to occupy an extended position in front of the seat, the mounting of the bed being such that in the unfolding operation the bed-sections are all raised to such an elevated position as to correspond approximately with the normal height of an ordinary bed of the bedstead type.

The invention is illustrated in its preferred embodiment in the accompanying drawings in which—

Figure 1 represents a sectional view of a sofa-bed constructed in accordance with our invention, the section being taken just inside of one of the end-standards of the main frame, and certain of the parts being shown brokenly; Fig. 2, an enlarged broken sectional view taken as indicated at line 2 of Fig. 3, said view showing details of the manner in which the forwardly shiftable carriage is connected with the end-standards of the main frame and the folded bed is mounted upon said carriage; Fig. 3, a view similar to Fig. 1, but showing the structure in bed form; Fig. 4, an elevational view of one of the clips employed for connecting the throw-links of the carriage with the end-standards of the main frame. Fig. 5, a sectional view of said clip, the part removed being indicated by dotted lines; Fig. 6, a broken plan sectional view taken as indicated at line 6 of Fig. 3; Fig. 7, a broken perspective view showing one corner of the carriage and the manner in which the intermediate bed section is mounted thereon, said view being taken from within the carriage; Fig. 8, a broken plan sectional view taken as indicated at line 8 of Fig. 7; Fig. 9, a broken sectional view taken as indicated at line 9 of Fig. 3 and showing the relation of the rear bed-section and the seat when the seat occupies the standing position and the rear bed-section occupies an elevated position; Fig. 10, a broken sectional view taken as indicated at line 10 of Fig. 9; and Fig. 11, a broken sec-

tional view taken as indicated at line 11 of Fig. 6 and showing a detail of the manner in which the carriage is connected with guides attached to the inner surface of the end-standards of the main frame.

In the preferred construction, A represents the main frame; B, a sofa-back fixedly secured between the end-standards thereof; C, a rearwardly swinging sofa-seat; D, a forwardly and rearwardly movable carriage mounted in the main frame; and E, a folding bed mounted on the carriage D.

The frame A may be of any suitable construction. In the construction illustrated, the frame comprises wooden end-standards 1 which constitute the arm of the sofa, and the rear connecting member 2. As will be understood, the end-standards may be made as plain or as ornamental as desired.

The back B may be attached in any preferred manner. As shown, it fits between the rear portions of the end-standards 1 and is rigidly secured thereto. Ordinarily, the back comprises a frame equipped with an upholstered pad, and preferably the back inclines somewhat rearwardly and upwardly, as shown.

The seat C may be of any preferred construction. As shown, it comprises a spring-supporting frame 3 which usually is equipped with an upholstered pad 4. The frame 3 has a front member 5 which has a downward extension 6 projecting beneath the end members of the seat frame and is complementary to a front piece carried by the carriage.

The carriage D, in the form illustrated, comprises a pair of slides 7 joined by a rear connecting member 8 and a front piece 9 upon which the downward extension 6 of the seat frame rests when the structure is in closed condition; and a channel-bar 10 located immediately behind the front piece 9 and connected, through the medium of channel-form uprights 11 and spacing-blocks 12, with the front portions of the slides 7, the upper portions of the uprights 11 being joined, by braces 13, to the channel-bar 10 some distance from its ends, so that the members 9, 10, 11 and 12 really form a truss upon which the intermediate bed-section is foldably mounted. Attached to the outer surfaces of the lower portions of the slides 7, as shown in Figs. 2 and 11, are horizontally disposed metal bars 14 equipped with rollers 15 adapted to move in runways, or guides, 16 which are securely fastened at the inner sides of the lower portions of the end-standards 1 of the main frame. Each guide, or runway, 16 is of box form with the intermediate portion of one side cut away, as indicated, thus affording a slot 17 flanked by flanges 18. Each roller is mounted upon a headed stud 19 which has its shank riveted to the bar 14, the roller

having a reduced shank 20 which extends through the slot 17. It will now be understood that the rollers 15 are not only movable in the guides 16, but the carriage, by virtue of the roller and guide connection, forms a connecting medium between the end-standards of the main frame.

In the construction illustrated, the seat is pivotally connected with the rear portion of the forwardly and rearwardly shiftable carriage, and is linked to the main frame, so that when the seat is raised to the standing position the carriage will be automatically moved forward, and when the seat is lowered to the closed position, the carriage will be automatically retracted. The means illustrated for accomplishing this purpose comprise the short bars 21 fixedly secured to the rear portions of the end members of the seat-frame 3 and having their rear ends connected, by pivots 22, with standards, or hinge-members, 23 secured to the rear upper corners of the slides 7; and links 24, whose rear ends are joined, by pivots 25, to the front ends of the bars, or hinge-members 21, and whose front ends are detachably and pivotally joined, by clips 26, to the inner surfaces of the end-standards 1 of the main frame. Each clip 26 has its upper edge provided with a slot, or recess 27 adapted to removably receive a stud 28 which projects laterally from the adjacent end of the corresponding link 24. Connected to each clip, by a pivot 28^a, is a hook, dog or latch 29 having a nose, or hook-portion, 30 adapted to project across the slot 27 above the stud 28 and prevent dislodgment of the stud. The dog 29 is normally held in the engaging position by a spring 31 connected with its pivotal portion, and the disposition of the dog is such that when a pull is exerted through the link 24 in the operation of raising the seat to the standing position, the dog will prevent the stud 28 from leaving the slot 27. Each dog 29 has a finger-piece 32 by means of which it may be retracted when it is desired to disconnect the carriage and links 24 from the main frame.

The folding-bed E, in the construction illustrated, comprises an intermediate section 33 foldably mounted on supports 34 which are, in turn, foldably mounted upon the uprights 11 of the truss connecting the front portions of the slides 7 of the carriage. The supports 34 are of channel form and are connected with the channel-form uprights 11 by means of pivots 35. The intermediate bed-section 33 preferably comprises angle-bar members having intumed flanges 36 to which are secured plates, or members 37, which in turn, are secured to the channel-form members 38, which are connected by pivots 39 with the upper end portions of the supports 34. This arrange-

ment is clearly shown in Fig. 7. The upper ends of the pivotally mounted supports 34 are squared, as indicated at 40, to afford a bearing for the plate 37 when the bed is in the extended position, and the front upper corners of the members 34 are rounded, as indicated at 41, to permit the intermediate bed-section to fold with relation to the supports 34 when the supports 34 are folded with relation to the uprights 11 of the carriage. The bed further comprises a U-shaped front section 42 the end members, or arms, of which are connected, by pivots 43, with the front portions of the members constituting the intermediate bed-section; a rear U-shaped bed-section 44 the end members, or arms, of which are connected by pivots 45, with the rear ends of the members of the intermediate bed-section; and a foldable wire mattress or bed-bottom 46 attached to the arms of the front, rear and intermediate bed-frame sections. Connected with the end members of the rear bed-frame section are slides, or shiftable clips, 47 to which are joined links 48. The links 48 are connected at one end, by pivots 49, with the lower portions of the slides 7 of the carriage, and at the other end, by pivots 50, with the slides 47. Connected with the slides 47, as through the medium of the pivots 50, are links 51 the front ends of which are connected, by pivots 52, with the meeting ends of links 53 and 54. The links 53 have their other ends connected, by pivots 55, with the end members of the front bed-frame section a short distance in front of the pivots thereof; and the links 54 have their other ends connected, by pivots 56, with the frame members of the intermediate bed-section. Connected with the pivots 52 are brace-links 57 whose opposite ends are joined, by pivots 58 (see Fig. 7) to the inner surfaces of the upper front corners of the slides 7 of the carriage. Connected with the end-members of the front bed-section 42 are legs 59 having upward extensions joined by links 60 to the intermediate portions of the links 53. The legs 59 are connected by pivots 61.

The guides, or runways, supporting the carriage are designed to support the carriage in its movement, so that it will be unnecessary to provide casters running upon the floor, the objection to the use of such casters being that they mar the floor and interfere with rugs. To support the front portion of the carriage in the advanced position of the carriage, we provide a pair of vertically movable casters, or rollers, 62 journaled in levers 63 which are connected by pivots 64 with the lower front portions of the slides 7 of the carriage. The opposite ends of the levers 63 are connected, by links 65, with the links 48, and it will now be understood that after the carriage is

moved forwardly, the rollers 62 will be lowered to rest upon the floor in the operation of unfolding the bed. The rollers 15 with which the carriage is equipped are located some distance in the rear of the front portion of the carriage, and in order to support the front portion of the carriage securely when the carriage is in the retracted position, we equip the lower front corners of the slides 7 of the carriage with projections, or fingers, 66 (Fig. 6) adapted to enter the front ends of the box-form runways when the carriage is retracted. It will be understood that this feature of construction provides against racking or forward tilting of the carriage when it is in its retracted position, in which position the front portion of the seat is supported upon the front portion of the carriage, and hence the weight of occupants of the sofa would be transmitted through the front portion of the carriage. After the seat has been raised to the standing position shown in Fig. 3, thus automatically shifting the carriage to the advanced position, the bed is unfolded from the position which it occupies on the carriage, as illustrated in Fig. 1, so as to occupy the extended position shown in Fig. 3. In this operation, the roller-equipped supports 63 for the front portion of the carriage are automatically lowered through the medium of the link 65, to rest upon the floor.

The complete operation may be stated briefly: Assuming the structure to be in the folded condition shown in Fig. 1, the folded bed mounted on the carriage is normally housed beneath the sofa-seat. Assuming the bed to have been properly made up before the sofa-bed structure was converted into sofa form, it is only necessary, to prepare the bed, to raise the sofa-seat to the standing position, thereby shifting the carriage forwardly, and thereafter to unfold the bed from its position on the carriage. In the operation of raising the seat to the standing position, tension is exerted from the clips 26 attached to the main frame through the links 24 and pivots 25, and a forward thrust upon the carriage is exerted through the hinge connections between the seat and carriage. After the carriage has been moved to the advanced position, the bed may be unfolded by lifting upon the front bed-section 42, in which operation the intermediate bed-section 33 and its folded supports 34 will be swung to the elevated position, and, at the same time, the slides 47 will be drawn forwardly and the links 48 swung upon the pivots 49, thereby elevating the rear bed-section 44. When the rear bed-section reaches the elevated position, its rear portion lies beneath the blocks, or members, 67 attached to the rear or lower portion of the seat-frame 3, as will be understood from Figs. 9 and 10. In the operation of unfolding

the bed, the links 60 operate to swing the legs 59 to the supporting position.

When it is desired to convert the structure from bed form to sofa form, the bed is made up and secured to the foldable bed-frame by suitable means (not shown), the bed is then folded upon the carriage, in which operation the rear bed-section drops to the plane of the lower portion of the carriage, the supports 34 swing rearwardly and downwardly about the pivots 35 until said supports occupy a depending position beneath said pivots, and the intermediate bed-section breaks at the joints, or pivots, 39 and occupies a vertical position adjacent the supports 34, as will be clearly understood from Fig. 1. The sofa-seat may then be lowered, or swung forwardly and downwardly, in which operation a rearward thrust is exerted upon the carriage through the medium of the hinge connection between the seat and carriage, and this thrust is counteracted by a thrust transmitted through the links 24 to the main frame.

To facilitate the forward movement of the carriage, we prefer to employ springs 68 which are attached to the rear portion of the carriage and the end-standards of the main frame, as shown in Fig. 3. When the carriage is retracted, these springs are placed under tension, as shown in Fig. 1, and thus aid in shifting the carriage forward when the seat is lifted. In the reverse operation, the weight of the seat aids the operator in shifting the carriage rearwardly.

While it is preferred to employ the links 24 to automatically shift the bed, as a whole, in the operation of raising or lowering the seat, the invention is not limited to the employment of this expedient. If desired, the links 24 may be omitted and the forward and rearward shifting of the carriage D may be effected by hand.

The foregoing detailed description has been given for clearness of understanding only, and no undue limitation is to be understood therefrom, but the appended claims are to be construed as broadly as permissible in view of the prior art.

What we regard as new and desire to secure by Letters Patent, is—

1. In a sofa-bed, the combination of a frame, a forwardly shiftable carriage therein, a rearwardly swinging seat, an intermediate bed section foldably mounted on the front portion of said carriage, front and rear bed sections pivotally connected with said intermediate bed section, links pivotally connected with said carriage and slidably engaging the rear bed section, links pivotally connected with each other and with the front and intermediate bed sections, and links connecting said second-named links with said first-named links.

2. In a sofa-bed, the combination of a

frame, a forwardly shiftable carriage, an intermediate bed section foldably mounted on the front portion of said carriage, front and rear bed sections pivotally connected with said intermediate section, links pivotally connected with said carriage and slidably engaging said rear bed section, links pivotally connected with each other and with said front and intermediate bed sections, actuating links for said first-named links connected with said second-named links, foldable legs connected with said front bed section, and links connecting said foldable legs with said second-named links.

3. In a sofa-bed, the combination of a frame, a forwardly shiftable carriage therein, a rearwardly swinging seat, an intermediate bed section foldably mounted on the front portion of said carriage, front and rear bed sections pivotally connected with said intermediate section, a pair of links pivotally connected with said intermediate bed section, a pair of links pivotally connected with said front bed section and with said first-named links, a pair of links pivotally connected with said carriage and with the junctions of said first and second named links, and means connected with said links for elevating said rear bed section.

4. In a sofa-bed, the combination of a frame, a forwardly shiftable carriage therein, a rearwardly swinging seat, an intermediate bed section foldably mounted on the front portion of said carriage, front and rear bed sections pivotally connected with said intermediate section, a pair of links pivotally connected with said intermediate bed section, a pair of links pivotally connected with said front bed section and with said first-named links, a pair of links pivotally connected with said carriage and with the junctions of said first and second named links, means connected with said links for elevating said rear bed section, legs foldably connected with said front bed section, and links pivotally connected with said legs and with said second-named links.

5. In a sofa-bed, the combination of a frame, a pair of pivotal supports, an intermediate bed section pivotally mounted on said supports and adapted to fold with relation thereto, said intermediate bed section equipped with shoulders adapted to bear upon the upper ends of said supports, front and rear bed sections pivotally connected with said intermediate bed section, said front section being spaced above the rear section in the folded condition of the structure, means connected with the front bed section for elevating the rear bed section when the bed is opened and for swinging the intermediate bed section and its supports to an elevated position and bracing the same in said position, means for supporting the front portion of the front bed section

in the extended position, and a rearwardly swinging seat beneath which the folded bed is normally housed.

6. In a sofa-bed, the combination of a
5 frame, a rearwardly swinging seat, a forwardly shiftable carriage, a pair of supports pivotally connected with the front upper portion of said carriage and normally depending from their pivots, an intermediate bed section normally occupying a substantially vertical position in the folded condition of the structure and pivotally connected with the lower ends of said supports and lying substantially parallel with said
10 supports, front and rear bed sections pivotally connected with said intermediate section, the front section being normally spaced above the rear bed section, links pivotally connected with said carriage and slidably engaging said rear bed section, pairs of links pivotally connected with the front and intermediate bed sections and with each other, links connecting said last-named links with said first-named links, brace-links pivotally
15 connected with said carriage and with said second-named links, and legs foldably connected with the front bed section.

7. In a sofa-bed, the combination of a frame comprising end-standards, a carriage located between said end-standards, guide connections between said carriage and said end-standards adapted to transmit tension from one end-standard to the other, whereby said carriage serves as a truss between said end-standards, a swingingly mounted seat, and a folded bed mounted on said carriage and normally housed beneath said seat and comprising a plurality of bed sections foldably connected with each other
30 and with said carriage.

8. In a sofa-bed, the combination of a frame comprising end-standards, an interposed carriage, guides and flanged rollers connecting said carriage and end-standards, whereby the carriage will serve as a truss between said end-standards, a swingingly mounted seat, and a folded bed mounted on said carriage and comprising a plurality of bed sections foldably connected with each other and with said carriage.
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9. In a sofa-bed, the combination of a frame comprising end-standards, a carriage, guide connections between said carriage and end-standards, said carriage equipped at its front portion with a truss, folding supports connected with the uprights of said truss, an intermediate bed section foldably connected with said supports, and front and rear bed sections pivotally connected with said intermediate bed section.
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10. In a sofa-bed, the combination of a frame, a forwardly shiftable carriage, guide connections between said carriage and frame, normally elevated supports, connected with the front portion of said carriage and adapted to be lowered with relation to the carriage after the carriage has been shifted forwardly, and a folded bed mounted on said carriage and comprising a plurality of bed sections foldably connected with each other and with the front portion of said carriage.
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11. In a sofa-bed, the combination of a frame, a carriage, guide connections between said carriage and frame, a pair of normally elevated supports for the front portion of the carriage, a folded bed comprising a plurality of bed sections foldably connected with each other and with said carriage, and actuating means for said supports adapted to be actuated by said folded bed in the operations of unfolding and folding the same.
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12. In a sofa-bed, the combination of a frame, a forwardly shiftable carriage, a folded bed comprising a plurality of bed sections foldably connected with each other and with said carriage, links pivotally connected with said carriage and serving to elevate the rear bed section, and normally elevated supports for the front portion of the carriage connected with said links and adapted to be moved into contact with the floor in the operation of unfolding the bed.
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13. In a sofa-bed, the combination of a frame comprising end-standards, an interposed carriage, guide connections between said carriage and end-standards, supports connected with the front portion of said carriage and adapted to be supported on said frame in the retracted position of the carriage, a folded bed comprising a plurality of bed sections foldably connected with each other and with said carriage, and a movably mounted seat beneath which said bed is normally housed.
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14. In a sofa-bed, the combination of a frame comprising end-standards, a forwardly shiftable carriage located between said end-standards and having its lower front portion equipped with a front piece, a rearwardly swinging seat having the front portion of its frame equipped with a rigidly carried downward extension affording a supplemental front piece, and a folded bed normally housed beneath said seat and comprising a plurality of bed sections foldably connected with each other and with said carriage.
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15. In a sofa-bed, the combination of a frame comprising end-standards, a forwardly shiftable carriage in said frame between said end-standards, guide connections between said frame and carriage, said carriage comprising slides and a front truss equipped with uprights and spacing-blocks interposed between said uprights and said slides, supports pivotally connected with said uprights, an intermediate bed section pivotally connected with said supports, front and
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rear bed sections pivotally connected with said intermediate section, pairs of links pivotally connected with said front and intermediate bed sections and with each other, 5 brace-links pivotally connected with said first-named links and with the front upper corners of said slides above said spacing-blocks, a pair of links pivotally connected with the lower portion of said carriage and 10 slidably engaging said rear bed section, and links connecting said last-named links with said first-named links.

16. In a sofa-bed, the combination of a frame, a rearwardly swinging seat, a forwardly shiftable carriage, and a folded bed 15 comprising a plurality of bed sections foldably connected with each other and with said carriage, said rear bed section adapted, when elevated, to engage the pivotal portion

of said seat when the seat is in the standing position, thereby to prevent accidental descent of the seat. 20

17. In a sofa-bed, the combination of a main frame, a forwardly shiftable carriage comprising a pair of slides and a front connecting truss having channel-form uprights, 25 channel-form supports pivotally connected with the upper portions of said uprights, an intermediate bed section pivotally connected with said supports, and front and rear bed sections pivotally connected with said intermediate bed section. 30

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CHARLES HULTGREN.

In presence of—

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