

G. PUCCIA.
SOFA BED OR ARM CHAIR BED.
APPLICATION FILED JAN. 22, 1912.

Patented May 26, 1914.

3 SHEETS—SHEET 1.

1,098,169.

Fig. 1.

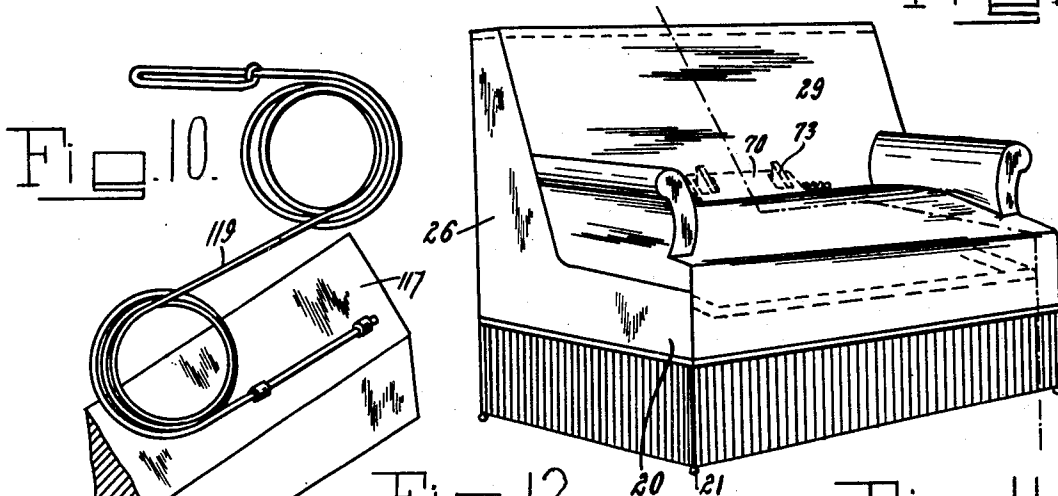


Fig. 12.

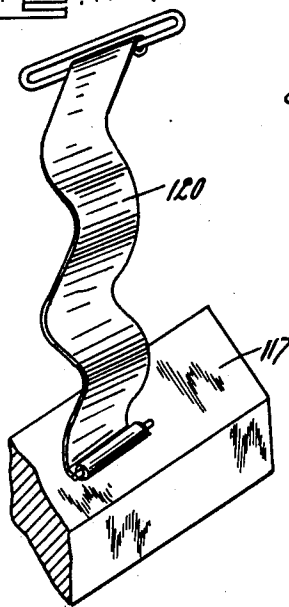


Fig. 11.

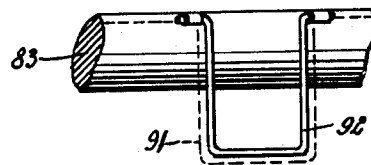
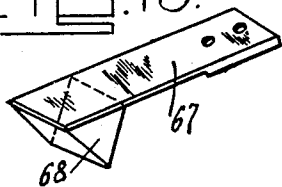


Fig. 13.

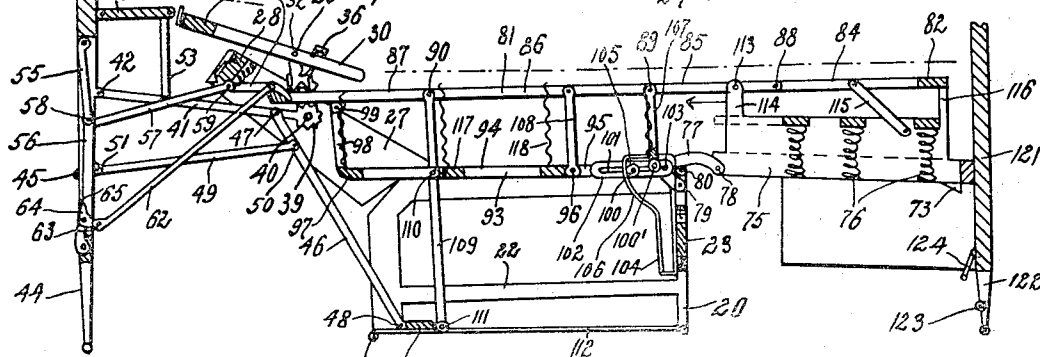
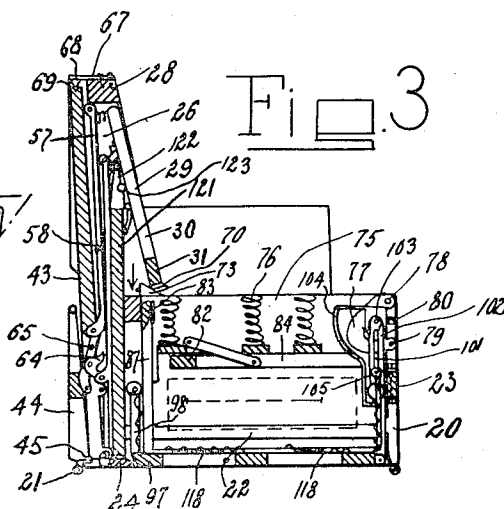
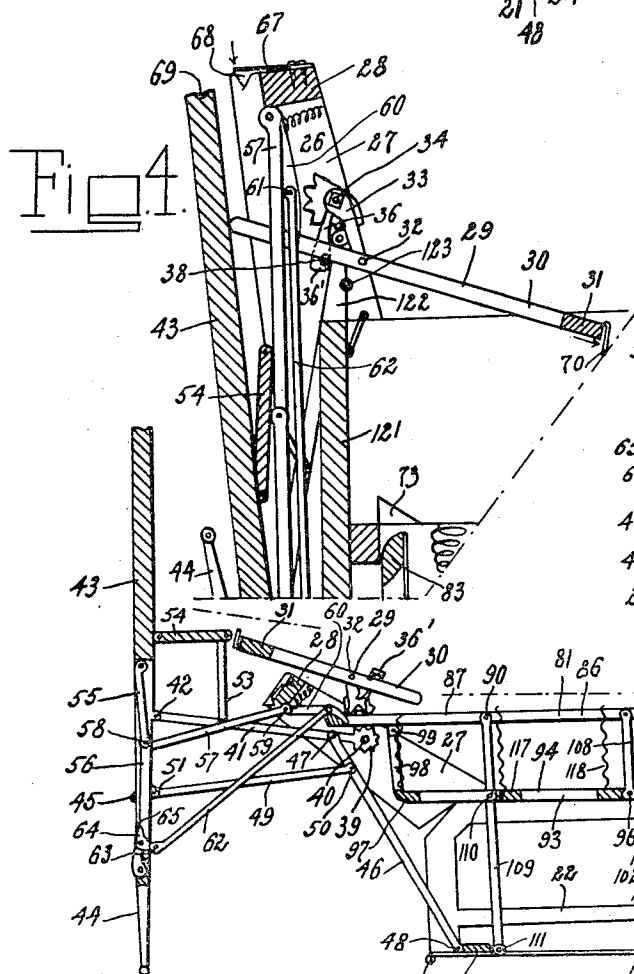
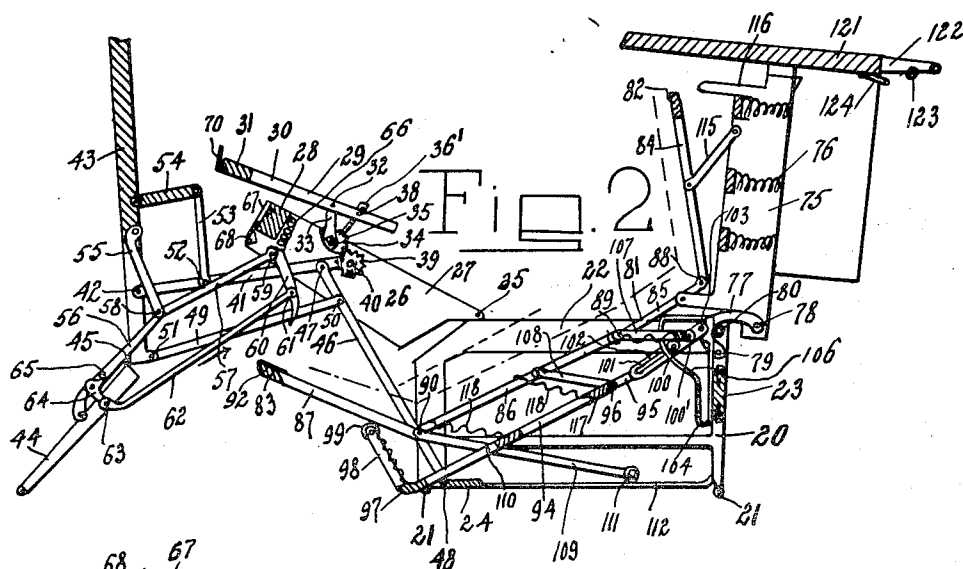


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APPLICATION FILED JAN. 22, 1912.

3 SHEETS--SHEET 2.



WITNESSES

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Fig. 5

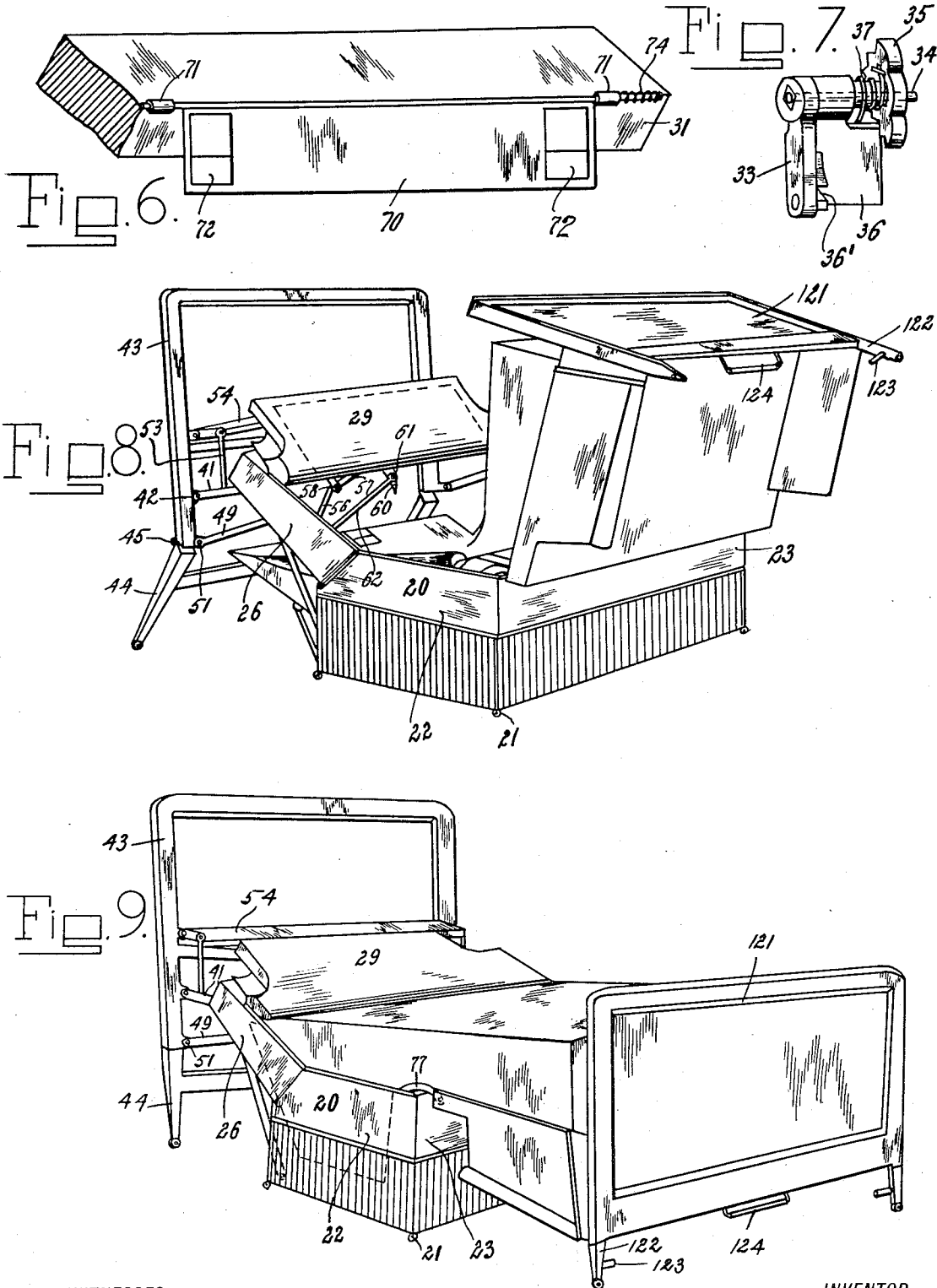
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SOFA BED OR ARM CHAIR BED.
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3 SHEETS—SHEET 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

GIOVANNI PUCCIA, OF NEW YORK, N. Y.

SOFA-BED OR ARM-CHAIR BED.

1,098,169.

Specification of Letters Patent.

Patented May 26, 1914.

Application filed January 22, 1912. Serial No. 672,641.

To all whom it may concern:

Be it known that I, GIOVANNI PUCCIA, a subject of the King of Italy, residing at New York city, in the county of New York and State of New York, have invented a new and useful Sofa-Bed or Arm-Chair Bed, of which the following is a specification.

The present invention relates to improvements in convertible furniture, and more particularly to sofas or chairs which can be converted into beds. The invention pertains to that type of convertible furniture which is disclosed in my French Letters Patent Nos. 367,095 and 383,753.

One of the objects of the present invention is to provide a sofa or chair which is of simple construction, and which can be easily extended into a bed, and conveniently folded or closed.

Another object of the invention is to produce a structure of this type, the several elements of which are securely held in their extended positions and also safely locked in their closed positions.

With these and other objects in view, which will more fully appear as the nature of the invention is better understood, the same consists in the combination, arrangement and construction of parts hereinafter fully described, pointed out in the appended claims and illustrated in the accompanying drawings, it being understood that many changes may be made in the size and proportion of the several parts and details of construction within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

One of the many possible embodiments of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a device constructed in accordance with the present invention, folded to form a sofa; Fig. 2 is a vertical longitudinal section taken through the device in its partly open position; Fig. 3 is a similar section of the device in its closed position; Fig. 4 is an enlarged vertical section taken through the upper part of the device in its partly open position; Fig. 5 is a longitudinal vertical section taken through the furniture in its fully open position; Fig. 6 is a perspective view of a detail of construction of a locking device employed in

connection with the invention; Fig. 7 is a perspective view of a detail of the actuating mechanism of one of the folding parts of the furniture; Fig. 8 is a perspective view of the furniture in its partly open position; Fig. 9 is a similar view of the device in its fully open position; Fig. 10 is a perspective view of a spring of the mattress support thereof; Fig. 11 is a plan view of a detail of construction; Fig. 12 is a perspective view of a modification of the spring shown in Fig. 11; and Fig. 13 is a perspective view of another locking element of the device.

At the outset it is to be observed that the invention is applicable both to sofas and chairs, the difference between the two structures being that the transverse bars, which connect the sides of the furniture, will be longer in one case and shorter in the other one.

Broadly speaking, the folding bed consists of a base section, to which is pivoted a foot section constituting the seat portion of the sofa or arm-chair, and a head section which forms the back portion of the sofa or arm-chair, in combination with a foldable and collapsible mattress supporting frame that is attached to the base and foot sections.

Referring now more particularly to the drawings, the numeral 20 indicates the base of the sofa, which is mounted upon casters 21. This base forms a box-like structure, comprising sides 22 and a front 23, connecting the said sides, the lower rear portions of said sides being united by a transverse bar 24. To the upper edges of the sides 22 is pivoted at 25, 25 the frame 26 of the sofa, said frame consisting of side bars 27, which are disposed parallel to the sides of the base, and of a transverse bar 28 that connects the upper portions of said side bars. On this frame is disposed the back 29 proper, which is connected with the frame 26 in a manner presently to be described. The back 29 comprises side bars 30, joined at their lower ends by a transverse bar 31, as clearly shown in Fig. 3 of the drawings. To each side bar 30 is pivoted at 32 a lever 33, carrying a pin 34, which is fixedly attached to a gear segment 35. The pins 34 are journaled in the side bars 27 of the frame 26. Upon each pin 34 is pivotally mounted a plate 36, having a hook 36', which is forced, when the sofa is being opened, by means of a spring 37 which is

coiled upon the said pin into engagement with a lug 38 upon the respective side bar 30 of the back. Each gear segment 35 meshes with a gear segment 39, which is fulcrumed at 40 to the respective side bar 27 of the frame 26, and attached to a lever 41, that is pivoted at 42 to a board 43, constituting the head board of the folding bed. This head board is provided with legs 44, that are hinged at 45 to the said head board in such a manner as to be folded upon the rear face thereof, as will appear hereinafter.

One end of a strut 46 is pivoted at 47 to each lever 41, the lower ends of said struts being fulcrumed at 48 to the sides of the base of the sofa. The struts 46 are connected with the board 43 by links 49, that are pivoted at 50 and 51 to the said struts and the board 43, respectively. To each lever 41 is furthermore pivoted at 52 a link 53, said links being in a similar manner connected to a transverse board 54, that is pivoted to the inner face of the head board 43.

The head board 43, its legs 44 and the frame 26 are interconnected by a plurality of links, denoted by the numerals 55, 56 and 57. These three links are pivoted to each other at 58, the link 55 being fulcrumed to the head board, the link 56 to the legs 44, and the link 57 to the frame 26. The pin 59, which attaches the link 57 to the frame 26, forms at the same time the fulcrum of a lever 60, that is pivotally secured at 61 to one end of an actuating rod 62, the other end of the latter being pivoted at 63 to a bellcrank lever 64, that is fulcrumed upon the link 56. The free arm of the bellcrank bears against a pin 65 upon the link 56, for a purpose hereinafter to be described. A spring 66 tends to raise the free end of the lever 60. The purpose of this arrangement will be explained hereinafter.

Upon the transverse bar 28 of the frame 26 is mounted a locking bolt, comprising a blade spring 67, carrying a lug 68, which is adapted to enter a recess 69 in the upper edge of the head board 43, when the sofa is in its closed position. For holding the back 29 in properly closed position, its transverse bar 31 carries a locking element adapted to coact with a locking element upon the seat of the sofa. The locking element carried by the transverse bar 31 comprises a plate 70, shown in detail in Fig. 6 of the drawings, said plate being hinged at 71 to said transverse bar and being provided with apertures 72, in which are seated, when the sofa is closed, triangular elements 73 upon the seat of the sofa, springs 74 keeping the said plate in proper engagement with said triangular elements, but permitting the plate to be raised manually and to be disengaged therefrom.

The sofa is provided with a seat 75, comprising the usual box-shaped frame that is

upholstered and provided with springs 76 in the ordinary manner. This seat is fastened to the base of the sofa by two hinges in the form of bent links 77, which are pivoted at 78 and 79 to the seat and to the base, respectively. Stops 80 upon the base limit the movements of the links 77 as the sofa is being opened in converting it into a bed.

The mattress supporting frame of the bed comprises two side bars 81, connected at their ends by transverse bars 82 and 83. The side bars 81 are each made of a plurality of sections, denoted in their order by the numerals 84, 85, 86 and 87. These sections are pivoted together at 88, 89 and 90, to permit the frame to be folded in a manner hereinafter to be described. The frame is covered by a suitable fabric, which may be either composed of wire links, as usual in bed bottom constructions, or it may be an ordinary fabric supported by springs hereinafter to be described. The central portion of the transverse bar 83 is somewhat tapered and serves as a support for the free curved end of the lever 60 when the bed is in its open position (Fig. 5), said lever projecting through a hole 91 (Fig. 11) in the fabric of the mattress frame. Around this hole is disposed a bail-shaped member 92, that is attached to the transverse bar 83 and disposed in a substantially horizontal plane above the free end of said lever. The mattress supporting frame is connected with the seat of the sofa and with an underframe 93, the latter being disposed, when the sofa is in its closed position, within the base 20. This underframe comprises an oblong structure having side bars which are made of two sections 94 and 95, pivoted together at 96, the section 94 being connected by a transverse end bar 97, from which rise standards 98, provided upon their upper ends with rollers 99, that are adapted to bear against the sections 87 of the side bars of the mattress supporting frame. The section 95 of the underframe is made adjustable in length, and for this purpose it carries pins 100 and 100' disposed within slots 101 in links 102, which are pivoted at 103 to brackets 104, that are fastened to the sides 22 of the base of the sofa. Upon the pins 100 and 101' are mounted anti-friction rollers 105, which bear against cam-shaped faces 106 upon the brackets. The connection between the mattress frame and the underframe is made by a plurality of links, more particularly links 107, which connect the pins 100' with the pivots 89 connecting the sections 85 and 86 of the mattress supporting frame.

Links 108 are pivoted to the sections 86 of the mattress supporting frame and fulcrumed to the pivots 96, which connect the sections 94 and 95 of the underframe, and finally they are connected by a pair of legs

109, which are fulcrumed to the pivots 90, connecting the sections 86 and 87, and fulcrumed at 110 to the section 94 of the underframe. These legs extend below the underframe and are provided on their lower ends with rollers 111, which run on tracks 112 upon the base 20. The mattress supporting frame is, as above mentioned, connected also with the seat of the sofa, more particularly the sections 85 of its side bars are pivoted at 113 to vertical standards 114 upon the underface of the seat, the section 84 of the mattress frame being connected by links 115 with the seat, said links being pivoted to the elements mentioned. The transverse bar 82 of the mattress supporting frame is adapted to rest, when the bed is in its open position, upon standards 116 on the seat of the sofa. The underframe is provided with a plurality of transverse bars 117, supporting springs 118 of the type shown either in Fig. 10 of the drawings or in Fig. 12, said springs being attached at their lower ends to said transverse bars and at their upper ends to the covering of the mattress supporting frame. The springs 119 shown in Fig. 10 of the drawings are of the coiled type, and those shown in Fig. 12, and denoted by the numeral 120, of the corrugated blade type, both of said types being adapted to follow the motions of the several links connecting the underframe with the mattress supporting frame, and to be folded upon the under-frame when the mattress supporting frame and underframe are being collapsed and folded.

To the seat of the sofa is fixedly attached a board 121, forming the foot board of the bed, said board being provided with legs 122 having inwardly projecting lugs 123, that are adapted to abut against the side bars 30 of the back 29, when the sofa is being closed. A handle 124 is attached to the board 121 for facilitating the opening and closing of the foot section of the bed.

Upon the mattress supporting frame rests a mattress, shown in dotted lines in the drawings, said mattress being attached in any suitable manner to said frame and is adapted to be folded therewith as the sofa is being closed. The sofa is upholstered in the usual manner, it being, however, obvious that the upholstery on the back 29 is independent of that of the other parts of the structure.

The operation of this device is as follows: Normally the parts are in the positions shown in Figs. 1 and 3 of the drawings, in which the lug 68 of the blade spring 67 is seated in the recess 69 in the head board 43, the triangular elements 73 upon the sofa seat being disposed in the apertures 72 in the plate 70, that is attached to the transverse bar 31 of the back 29. The sofa is thus held locked in its closed position, in which the

mattress supporting frame and the underframe is disposed within the base of the sofa, the mattress carried by the said frame being folded, as shown in dotted lines in Fig. 3 of the drawings.

To open the sofa, the operator takes hold of the plate 70, disengages the same from the triangular elements 73 and swings the back 29 of the sofa around the pivots 32. The upper edges of the side bars of the back are thus brought to bear against the head board 43 of the bed (Fig. 4), whereby the lug 68 of the blade spring 67 is disengaged from the said head board. At the same time the lugs 38 enter the hooks 36' (Fig. 4), whereby the motion of the back of the sofa is transmitted to the gear segments 35, in mesh with the gear segments 39. As now the swinging movement of the back of the sofa is continued, the frame 26 is lowered, causing a motion of the link 57 around its pivot upon the said frame, said motion being transmitted to the links 55 and 56. The swinging of the levers 41 causes the head board 43 to be raised, the links 49 maintaining the said board in vertical position. The lever 60 is brought into the position shown in Fig. 2 of the drawings by means of the actuating rod 62, the bellcrank 64 and the link 56. The movement of the links 55, 56 and 57 causes, of course, the legs 44 of the head board of the bed to swing around the hinges 45 into the positions shown in Fig. 2 of the drawings. The transverse board 54 is extended into the position shown in Fig. 2. The handle 124 is then grasped and the foot section of the bed swung around the pivots 79 of the bent links 77. As soon as the said bent links are caused to bear against the stops 80, the foot section of the bed will swing around the pivots 78 of said curved links.

The mattress supporting frame, being pivoted at 113 to the seat of the sofa, will obviously, as the latter is being swung into its open position, be raised (Fig. 2). During this rising of the mattress supporting frame and the underframe connected therewith, the rollers 105 upon the pins 100 and 100' are guided in their movements by the cam shaped faces 106 of the brackets 104, the legs 109 sliding along the tracks 112, and the section 87 of the frame sliding upon the anti-friction rollers 99 on the standards 98 of the underframe. The transverse bar 83 of the section 87 of the mattress supporting frame is thus brought into engagement with the curved end of the lever 60, the latter being thereby shifted around its pivot, causing the legs 44 of the head board 43 to swing into the plane of said head board. At the same time, obviously, the transverse bar 82 of the mattress frame is caused to abut against the standards 116 upon the seat of the sofa.

In order to close the bed, obviously the reverse operations are necessary. The handle 124 is taken hold of and the foot section of the bed raised, whereby first the sections 85, 86 and 87 of the mattress supporting frame are shifted toward the head board 43, the bail-shaped member 92 thereby shifting the lever 60 toward the said head-board, which causes the parts of the head section of the bed to be brought into the positions shown in Fig. 2 of the drawings. Continuing the swinging of the foot section of the bed toward its closed position, the mattress supporting frame and the underframe connected therewith are lowered into the base of the sofa and collapsed, the cam-shaped face 106 of the brackets coacting with the rollers 105 of the pins 100, causing the section 95 of the underframe to be elongated, thus permitting its section 94 to be lowered into contact with the tracks 112. The legs 109 are brought into substantially parallel relation with said tracks by the time the foot board 121 is disposed in a vertical plane. The back 29 is then swung toward its closing position, which causes the head board 43 to be lowered and the frame 26 to swing on its pivots 25, which, in turn, results in a folding of the legs 44 upon the back surface of the head board 43. The transverse board 54 is, of course, in the meantime folded upon the inner surface of the said head board. The feet of the foot board 121, in meeting the frame 26, disengages the hooks 36' from the lugs 38, after which the back 29 turns on the pivots 32, the lug 38 then abutting against the levers 33 and thereby causing a further rotation of the gear segments 35. The back is thus brought to bear against the lugs 123 of the foot board 121, thus closing entirely the sofa, in which position, obviously, the plate 70 engages the triangular elements 73 of the seat of the sofa, and the lug 68 enters the recess 69 in the head board thereof. It is to be observed that the transverse board 54 forms, when the bed is in its open position, a continuation of the back 29, and serves to support the pillows.

From an inspection of Fig. 5 of the drawings, it appears that the standards 116 are disposed a little distance from the inner face of the foot board 121, permitting thus the edge portion of the comforters to be lowered into the space formed between the seat and the said foot board. This is specially desirable when the foot board is made in the form of those of the ordinary metallic bedsteads.

From the foregoing it appears that in order to close or open the bed, only two simple operations are necessary, that is to say the shifting of the back of the sofa and the swinging of the seat thereof. The head board of the bed is of normal height and

automatically folds upon closing the bed. By providing the bent links 77 as hinges between the base and seat of the bed, tearing of the material covering the upholstery of the sofa is effectively prevented, and the bed is lengthened.

It is to be observed that a comfortable mattress supporting frame is obtained, which is safely locked in its extended position, the same being collapsed, folded and stored away in the base of the sofa upon closing the bed.

What I claim is:

1. In a convertible sofa and bed, the combination with a box-like base, of a back frame hinged thereto, a back pivoted to said back frame, a head board, legs hinged to said head board adapted to be folded upon the rear face thereof, means interconnecting the elements mentioned, whereby upon swinging said back toward its reversed position said back frame is lowered and said legs are brought in a plane at an angle to the plane of said head board, a seat pivotally attached to the base having rigidly secured to its rear portion a foot board, a foldable underframe carried by said base, and a mattress supporting frame connected with said underframe and said seat, said mattress frame and underframe being adapted to be collapsed and folded into said base when said seat is folded over the said base and extended when said seat is swung around its pivots so as to be supported by said foot board, said mattress supporting frame causing during such swinging movement by the intermediary of said first mentioned means the legs of said head board to swing into the plane of the latter.

2. In a convertible sofa and bed, the combination with a box-like base, of a foot extension adapted to fold over said base to form a seat, a head extension adapted to fold substantially vertically to form the back to said seat, and a bed bottom connected with said base and foot extension, said bed bottom comprising a mattress supporting frame and an underframe, said mattress supporting frame being adapted to be folded onto said underframe and lowered into said base when said foot section is brought into a position to form a seat.

3. In a convertible sofa and bed, the combination with a box-like base, of a seat pivotally attached thereto having rigidly secured to its rear portion a foot board, a head extension adapted to fold substantially vertically to form the back to said seat, a foldable underframe carried by said base, and a mattress supporting frame connected with said underframe and said seat, said mattress frame and underframe being adapted to be collapsed and folded into said base when said seat is folded over said base and

extended when said seat is swung around its pivots so as to be supported by said foot board.

4. In a convertible sofa and bed, the combination with a box-like base, of a foot extension adapted to fold over said base to form a seat, a foot board made of one integral piece rigidly attached to said foot extension, and a head extension adapted to fold substantially vertically to form the back to said seat, said foot board being disposed in rear of said back when the bed is in its folded position.

5. In a convertible sofa and bed, the combination with a box-like base, of a back frame hinged thereto, a back pivoted to said back frame, a head board, legs hinged to said head board adapted to be folded upon the rear face thereof, means interconnecting the elements mentioned, whereby upon swinging said back toward its reversed position said back frame is lowered and said legs are brought in a plane at an angle to the plane of said head board, a seat pivotally attached to the base having rigidly secured to its rear portion a foot board, a foldable underframe carried by said base, a mattress supporting frame connected with said underframe and said seat, said mattress frame and underframe being adapted to be collapsed and folded into said base when said seat is folded over the said base and extended when said seat is swung around its pivots so as to be supported by said foot board, said mattress supporting frame causing during such swinging movement by the intermediary of said first mentioned means the legs of said head board to swing into the plane of the latter, coacting locking means upon said back and said seat for holding the back in its folded position, and coacting locking means upon said back frame and said head board for keeping the bed closed.

6. In a convertible sofa and bed, the combination with a box-like base, of a foot extension adapted to fold over said base to form a seat, a bed bottom connected with said base and foot extension adapted to be collapsed and folded into said base when said foot extension is brought into a position to form a seat, a back frame hinged to said base, a back pivoted to said back frame, a head board, legs hinged to said head board adapted to be folded upon the rear face thereof, means interconnecting said back frame, back, head board and legs, whereby upon reversing said back, said back frame is lowered, said head board is raised and said legs are brought in a plane at an angle to the plane of said head board, said bed bottom causing during the swinging thereof to its open position by the intermediary of said first mentioned means the legs of said head board to swing into the plane of the latter.

7. In a convertible sofa and bed, the combination with a box-like base, of a foot extension adapted to fold over said base to form a seat, a bed bottom connected with said base and foot extension adapted to be collapsed and folded into said base when said foot extension is brought into a position to form a seat, a back frame hinged to said base, a back pivoted to said back frame, a head board, legs hinged to said head board adapted to be folded upon the rear face thereof, means interconnecting said back frame, back, head board and legs, whereby upon reversing said back, said back frame is lowered, said head board is raised and said legs are brought in a plane at an angle to the plane of said head board, said bed bottom causing during the swinging thereof to its open position by means of said first mentioned means the legs of said head board to swing into the plane of the latter, and a foot board rigidly attached to said seat and disposed in rear of said back when the bed is in its folded position.

8. In a convertible sofa and bed, the combination with a box-like base, of a back frame pivotally attached thereto, a back pivoted to said back frame, a head board, legs hinged to said head board adapted to be folded upon the rear face thereof, and means interconnecting the elements mentioned, whereby upon reversing said back said back frame is lowered and said legs are brought in a plane at an angle to the plane of said head board.

9. In a convertible sofa and bed, the combination with a box-like base, of a back frame pivotally attached thereto, a back pivoted to said back frame, a head board, legs hinged to said head board and adapted to be folded upon the rear face thereof, and means interconnecting the elements mentioned, whereby upon reversing said back said back frame is lowered, said head board raised and said legs are brought in a plane at an angle to the plane of said head board.

10. In a convertible sofa and bed, the combination with a box-like base, of a back frame hinged thereto, a back, a lever pivoted to said back frame and said back, a head board, a lever pivoted to said head board and said back frame, and a gearing connecting said two levers.

11. In a convertible sofa and bed, the combination with a box-like base, of a back frame hinged thereto, a back, a lever pivoted to said back frame and said back, a head board, a lever pivoted to said head board and said back frame, a gearing connecting said two levers, legs hinged to said head board, and a plurality of levers connecting said back frame, head board and legs.

12. A bed bottom comprising a mattress supporting frame, an underframe in parallel

relation thereto, a plurality of springs connecting said frame with said underframe, and a plurality of links pivoted to said frames permitting same to be folded onto each other in abutting relation whereby said springs are folded in parallel relation to said underframe.

13. In a convertible sofa and bed, the combination with a box-like base, of a back

frame hinged to the upper edges thereof, a 10 back, a lever pivoted to said back frame and said back, a head board, a lever pivoted to said head board and said back frame, and a gearing connecting said two levers.

GIOVANNI PUCCIA.

Witnesses:

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ORESTE PASSETT.
