G. A. HOLST.

SOFA BED.

APPLICATION FILED MAR. 12, 1914.

1,126,010.

Patented Jan. 26, 1915.

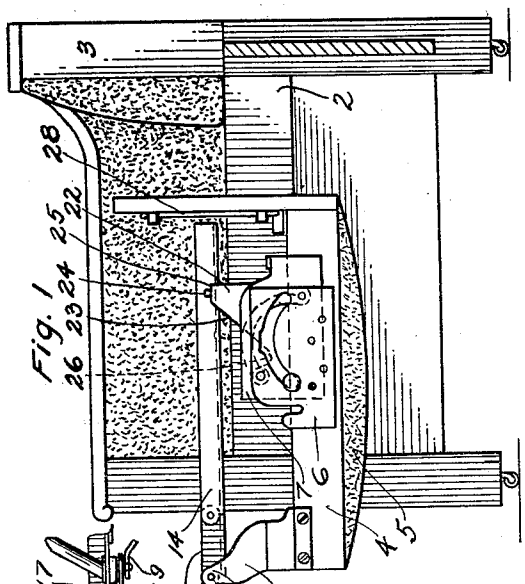


Fig. 1

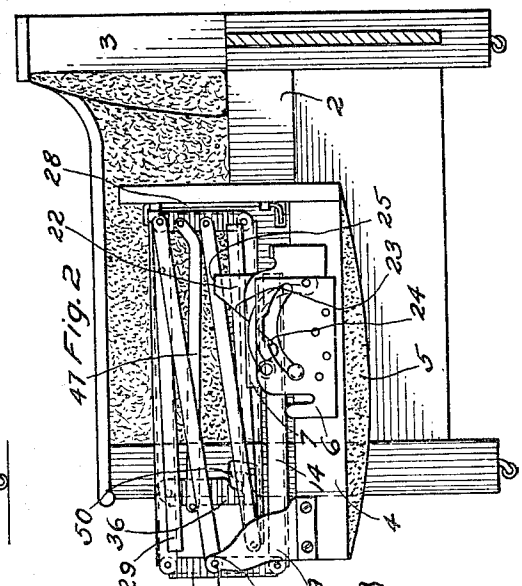


Fig. 2

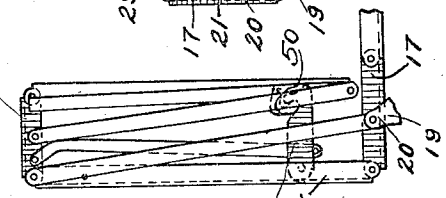


Fig. 3

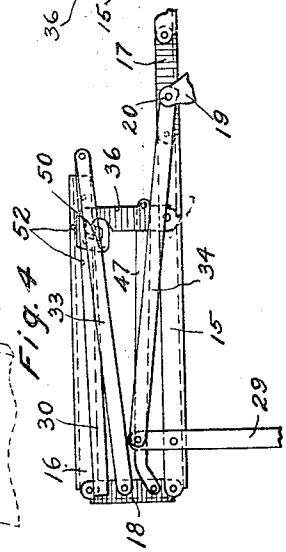


Fig. 4

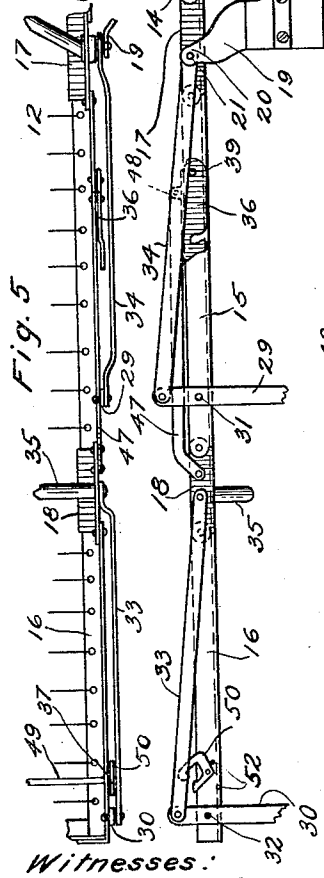


Fig. 5

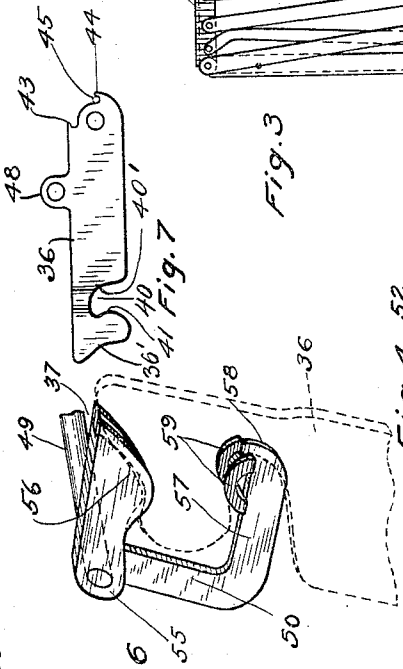


Fig. 6

Fig. 7

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UNITED STATES PATENT OFFICE.

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SOFA-BED.

1,126,010. Specification of Letters Patent. Patented Jan. 26, 1915.

Application filed March 12, 1914. Serial No. 824,120.

To all whom it may concern:

Be it known that I, GEORGE A. HOLST, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Sofa-Beds, of which the following is a specification.

This invention relates to convertible furniture of the class in which a series of foldably-related bed sections are arranged to unfold to form a bed, and more particularly to sofa beds in which means are provided for securing part of the sections in spaced folded relation while being unfolded or folded with respect to the remaining section or sections.

Beds of this character have been made in different ways, usually with the bed portion pivoted directly to the front of the sofa frame, or carried by a rotatably mounted hollow seat frame having a seat member for the sofa formed directly upon or carried by one side, and having the bed portion pivotally connected to and carried by the reverse side, the bed in either case being extensible transversely of the sofa and being foldable one section over another in the same direction for storage under the seat member when the bed is not in use.

The main objects of this invention are to provide an improved form of fastening adapted for securing one or more of the sections in folded relation during the folding of the remaining sections; to provide means of this character which shall require a substantial interval of time for operation; to provide a latch member operatable by gravity and in which inertia shall contribute essentially to its control for engaging and releasing of the fastening; and to provide complementary automatic means independently operatable on two adjacent main sections adapted to interlock when said sections are folded together.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Figure 1 is a side elevation of a sofa bed with the bed sections unfolded and with the near end of the sofa frame removed to show the details of the seat member and operating means associated therewith. Fig. 2 is a similar view showing the bed in its folded position and with the seat frame ready for turning to its upright or normal sofa position. Fig. 3 is a side elevation of the foot, middle and connecting sections of the bed illustrating the first stage of the unfolding operation with the foot section locked in spaced folded relation upon the middle section and both disposed in an upright position. Fig. 4 is a side view similar to Fig. 3 but illustrating the next stage of unfolding, the middle section being in its bed position and the foot section being folded thereupon. Fig. 5 is a broken plan view of a portion of the bed bottom when extended, and shows the relative position of the leg-folding and section-locking members on one side of the bed. Fig. 6 is a greatly enlarged perspective view of one of the latches carried by the foot section. Fig. 7 is a side elevation, somewhat enlarged, of one of the leg-controlled latches carried by the middle section.

In the construction shown in the drawings, the sofa bed comprises the usual housing or frame 1 having ends 2 and back 3 in combination with a rotary seat frame 4 operatively mounted between and supported by the ends 2. This seat frame on one side is adapted to serve as a seat 5, and the reverse side is formed as a hollow frame adapted and arranged to support the bed sections pivotally attached thereto for unfolding when the seat frame 4 is turned to its inverted position, as shown in Fig. 2. The connection of the seat frame 4 to the sofa frame 1 may comprise any of the means well known in the art, as plates 6 and 7.

The bed bottom or frame 12 comprises three wide major sections 14, 15 and 16 and two narrow minor sections 17 and 18 suitably hinged together, as by rule joints, in alternate position. These sections are adapted to be folded together upon the under side of and within the seat frame 4, with the three major sections lying substantially in horizontal position and with the minor sections vertically disposed at the opposite edges thereof.

Bed supporting brackets 19 are secured to the ends of the seat frame 4 adjacent to that edge of the seat frame which is in front when in the bed position. The outer and upper ends of these brackets are formed and adapted as at 20, to receive the pivot members 21 secured to the sides of the narrow bed section 17 intermediate of the ends thereof. The section 17 thus mounted is

adapted to swing from a vertical storage position to a horizontal bed position. The head section 14 and the middle section 15 are hinged to the section 17 at opposite ends thereof, lower and upper respectively when folded.

The head section 14 is raised and lowered in its horizontal position within the seat frame with the shifting of the narrow section 17 to and from its horizontal postion respectively, by means of plates 22 located rearwardly of the brackets 19 and adjacent to the ends of the seat frame 4. Each plate 22 is formed with a rearwardly inclined forward surface 23 on which slide the studs or shoulders 24 secured to the section 14, each of which surfaces 23 terminates at its upper end in a horizontal surface 25 on which the studs 24 rest when the section 14 is shifted to its elevated or bed position, and at its lower end terminates in a socket 26 which coacts with its respective stud 24 for securing the section 14 in its lowered position.

The foot minor section 18 and the foot major section 16 are hinged together, and the former is hinged to the middle major section 15. Sections 16 and 18 are adapted to be extended in horizontal alinement, or to be folded with section 15 upon the seat frame with the foot section 16 between the sections 14 and 15. The head and middle major sections may be of substantially the same length, but the foot section 16 is somewhat shorter so that it may be folded between the longer sections, the difference in length being substantially equal to the thickness of the mattress and usual bedding (not shown). The short sections 17 and 18 are also of different lengths, the difference being a little more than the thickness of the mattress and bedding.

The outwardly disposed sections are supported in their bed position by means of legs 29 and 30 pivoted at 31 and 32 to the outer ends of sections 15 and 16 respectively. These legs are automatically controlled by means of links 33 and 34 respectively as will be understood. The short foot section 18 is braced by a rod 35 connected at its ends to the medial portions of the sides, preferably at the pivotal connection of the links 34.

Locking means are provided adapted for manual control to secure the seat frame 4 in its bed position and to lock the bed sections in said frame when the latter is rotated to its sofa position, as for instance a bar 28 on the frame 4 having its upper and lower ends shouldered to engage the sections and sofa frame respectively, as will be undestood by reference to Figs. 1 and 2.

Improved means are provided for securing section 16 folded on section 15, comprising a pair of mechanically controlled latches 36 pivoted to opposite sides of section 15 and a latch member 37, controlled by gravity and inertia, pivoted to section 16 in coöperative relation with said latches 36 when section 16 is folded on section 15. The latches 36 each comprises a rigid plate or bar of elongated rectangular shape adapted and arranged for pivoting as at 39 on one end, and having its other end, which is movable, formed with a notch 40 in one edge adapted to receive a coacting portion of the foot latch, said movable end having a hook shape as at 41. The opposite edge of the notch serves as a seat 40′. Its free end is formed with an outwardly facing inclined shoulder 36′ adapted to co-act with latch member 37 for turning the latter. The pivoted end is provided with a pair of opposing shoulders 43 and 44 spaced apart about 90 degrees and a stud 45 is fixed in the side of the section in coöperative relation with each latch 36, each stud being positioned so as to be engaged by the shoulders 43 and 44 to limit turning of the latch to approximately 90 degrees, ranging from an inoperative position parallel with the side rail to an operative position perpendicular thereto.

Each latch 36 is operatively connected by a link 47 pivoted at its ends to medial portions of the latch as at 48, and corresponding side of the foot minor section 18, whereby the latch is thrown from a horizontal position by the side of the middle section to a vertical transverse position thereon when the foot minor section is turned upwardly by the initial folding operation and vice versa.

The latch member 37 on the foot section comprises a pivot shaft 49 carried at its ends by the side rails of the foot section and also a pair of similarly disposed latches 50 fixed rigidly upon the ends of said shaft, (only one end of said shaft being shown in the drawings). Stop-shoulders or studs 52 are fixed on the foot section to limit the range of pivotal turning of the latch member 37, by which means the latter is retained in operative position substantially as shown in Fig. 1. When the foot section is folded upon the middle section, as shown in Fig. 4, the latches 50 project downwardly and into engagement with the complementary latches 36 on the middle section. The joints connecting the three sections 15, 16 and 18, which are somewhat resilient, are so formed as to tend to resist further folding when the foot section reaches a position parallel with the middle section, as will be understood. Moreover the expansive pressure of the bedding (not shown) somewhat yieldingly opposes the close folding of said sections, and thereby holds the latches in tension when the sections 15 and 16 are folded together.

Each latch 50 comprises a medial portion 55 to which the shaft 49 is rigidly secured and a pair of arms disposed at an angle, preferably somewhat greater than 90 degrees. One of the arms 56 is relatively short

and heavy and projects diagonally downward at an angle of about 45 degrees from vertical when the latch is suspended freely, as when the foot section swings down into place over the middle section. The long arm 57 is L-shaped, with the lower part projecting forward under the pivot portion. The outer end of arm 57 is provided with an upwardly turned tip 58 giving the arm a hooked shape. The inner opposing faces of the arms are spaced apart and adapted to receive the hook portion of the coacting latch member 36, each of said opposing faces being provided with a pair of vertical guide flanges 59 between which the coacting hook member is received.

The inertia of the freely pivoted latch member 37 imparts a balanced or static effect and tends to dampen its action and prevent sudden movement, wherefore in locking the fastening the latches when thrown into coactive relation may be definitely hooked together by quickly releasing the pressure on the foot section before gravity has time to throw them out of coactive position, and in unlocking the fastening a brief but appreciable interval or time element is required after pressing down on the foot section in which gravity may overcome the inertia of latch member 37 and turn the same enough to release hook 41 from arm 57.

The operation for unfolding the bed is as follows: The seat frame is inverted from its sofa position and the bed sections are then unfolded to the position shown in Fig. 4, sections 15, 16 and 18 being rotated as a unit. The latch 50 on the foot section is then released from the coacting latch on the middle section by pressing down on the foot section adjacent to the latches, and then gradually releasing the pressure, whereby the lower arm 57 of the foot latch is disengaged from the underside of the hook part of latch 36, and gravity is given sufficient time to overcome the inertia of, and to act upon, the heavy arm 56 and thereby rotate the latch 50 a slight degree. Then as the downward pressure on the foot section is gradually removed, the heavy arm of the latch 50 causes said latch to rotate sufficiently to throw the arm 57 out of range for engagement with latch 36, so that the foot section will no longer be secured by said latches. Then when the foot section is raised for unfolding and is swung to its bed position, the latch 50 is prevented from swinging entirely out of its normal position by means of the oppositely disposed stops 52.

In folding the operation is as follows: The foot section is first folded over upon the middle section, in which operation the foot latch is actuated by gravity on the heavy arm to hold the lower arm back so as to pass the tip of the hook on latch 36, said heavy arm then coming into contact with shoulder 36′ on the upper side of said hook, whereby the foot latch is turning to throw the lower arm forward under the hook 41, downward pressure on the foot section being required to depress the same sufficiently for said operation. Then upon suddenly removing the pressure the foot section springs upward carrying the latch 50, which is prevented by its inertia from turning, and throwing the lower arm 57 into locking engagement with the hook 41, whereupon the sections 14, 15 and 18 may be turned as a unit to fold upon the head section, after which the seat frame may be rotated to its sofa position.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. In a device of the class described, a plurality of bed sections adapted to fold together, in combination with a pair of latch members adapted to interlock with each other and disposed on different said sections which are adjacent to each other when folded together.

2. In a device of the class described, a plurality of bed sections adapted to fold together, in combination with a pair of latch members adapted to interlock with each other and disposed on different said sections which are adjacent to each other when folded together, one of said latch members being so formed that gravity tends to turn it to and hold it in non-locking position when the section carrying it is folded horizontally upon the other section, and also having an arm adapted to coact with the complementary latch member to throw the latch members into engagement.

3. In a device of the class described, a plurality of bed sections adapted to fold together, in combination with a latch pivoted freely to one of the sections for gravity control through its range of movement except when locked, and a complementary latch pivoted to another of the sections and operatable by the folding of the first section thereupon for movement into a position wherein it is adapted for engagement with the first mentioned latch for securing said sections in spaced folding relation.

4. In a device of the class described, a plurality of bed sections adapted to fold together, in combination with a latch pivoted to an outer section and having its pivoted axis disposed transversely of the bed, said latch being free to swing by gravity into its operative position in folding said section, and a complementary latch pivoted to an inwardly disposed section and operatable by the folding movement of said outer section

for turning the same into its operative position, said latches being formed to interlock when said sections are folded.

5. In a device of the class described, a pair of complementary latch members adapted to coact when brought together, members mechanically related and movable toward and from each other on which said latch members are mounted respectively, one of said latch members having a hook portion adapted to engage the other latch member, said other latch member being pivoted and free to swing on its mounting and having a pair of arms formed and arranged to receive said hook portion therebetween, the opposing faces of said arms having guide flanges between which the said hook portion is disposed when said latches are engaged.

6. In a device of the class described, a latch member freely pivoted and having a medial pivot portion and a pair of arms radiating therefrom at an angle from each other, one of said arms being short and heavy and the other being relatively long and light, said member when free to swing being held by gravity with the long arm disposed laterally, said long arm being hook shaped and adapted when swung forward to liftingly engage a body arranged to be hung thereupon, and means for turning the latch to swing said arm forward.

7. In a device of the class described, a plurality of foldably related bed sections, in combination with a pair of latches carried thereby and adapted to interlock for securing said sections in folded relation, one of said latches being carried by the foot sections and being operatable by gravity in the folding operation and the other latch being operatable mechanically by the folding of said sections substantially as described.

8. In a device of the class described, a pair of latches adapted to interlock when brought together, supporting means movable toward and from each other for supporting said latches respectively, said latches being hook shaped for engagement by each other and having projecting means formed to guide the other latch into engagement therewith, and said other latch being formed and adapted for guidance into engagement with the first latch when caused to approach the same, said second latch being formed and arranged to be normally urged out of engagement by gravity and having sufficient inertia to prevent sudden turning out of engagement by gravity when the stress on said latches is suddenly changed from compression to tension and vice versa.

9. In a device of the class described, a support, a latch suspended pivotally from said support, in combination with a member having operative connection with said support and having a shoulder thereon formed for coaction with said latch and being adapted to deflect the same and guide it in its pivotal movement for throwing it rotatively into engagement with said member when by relative movement of said member and support the latch is carried toward said member, said latch and member having hook portions adapted to interlock, said latch being adapted to swing by gravity to a disengaged position when moved slowly away from said member, and said hook portions being shaped to interlock when said latch is restrained by inertia from swinging while said latch and member are more quickly moved apart.

10. In a device of the class described, comprising an end section and a second section upon which said end section is adjacently foldable, a pair of complementary coacting latch members, one of which projects upwardly from said second section and is provided with a transverse hook portion and the other of which is carried by said end section and is adapted for free pivotal support, the latter having a pair of arms, one of which is long and L-shaped with the lower part projecting under the body of the latch, the other arm being heavy and short, and adapted to coact at times with the first said latch to throw the said long arm into engagement with the said hook portion of the first mentioned latch member.

11. In a device of the class described, a pair of bed bottom frame members having connecting means adapted to permit relative movement of said members toward and away from each other, each of said members having thereon one of a pair of complementary fastening means adapted to engage each other when brought together and to resist both tension and compression when engaged, one of said fastening means being in the form of a latch pivoted to swing from one of said frame members when the same is apart from the other said frame member, and being adapted for gravity and inertia control, and the other of said fastening means carried by the other said frame member being formed for coaction with said latch and adapted to swing the same into engaging position when one of said frame members is moved toward the other, said latch being rotatably releasable by gravity from said other fastening means when said complementary means are free from both tension and compression.

Signed at Chicago this 9th day of March, 1914.

GEORGE A. HOLST.

Witnesses:
FRED M. DAVIS,
M. IRENE HUTCHINGS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Corrections in Letters Patent No. 1,126,010.

It is hereby certified that in Letters Patent No. 1,126,010, granted January 26, 1915, upon the application of George A. Holst, of Chicago, Illinois, for an improvement in "Sofa-Beds," errors appear in the printed specification requiring correction as follows: Page 2, line 10, for the word "postion" read *position;* same page, line 59, for the word "undestood" read *understood;* page 4, line 48, after the word "and" insert the word *one;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of February, A. D., 1915.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.