Aug. 24, 1948. M. R. BOIU 2,447,683

SOFA BED HINGE

Filed Dec. 11, 1944

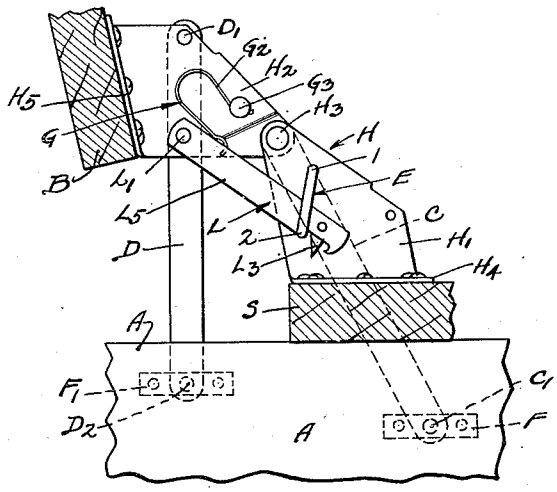


Fig. 1

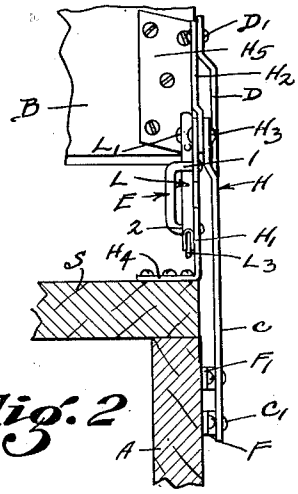


Fig. 2

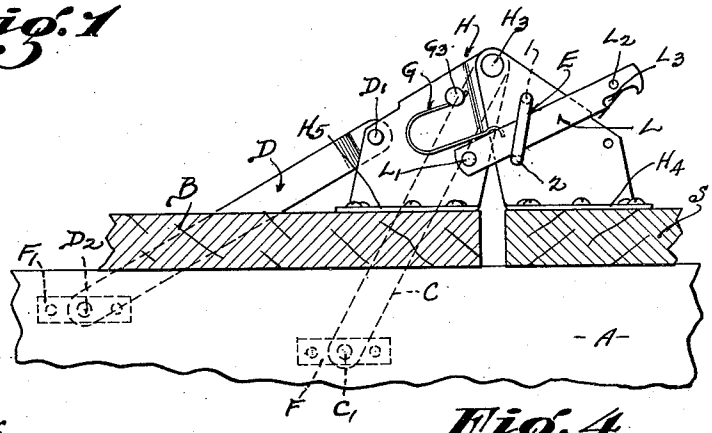


Fig. 4

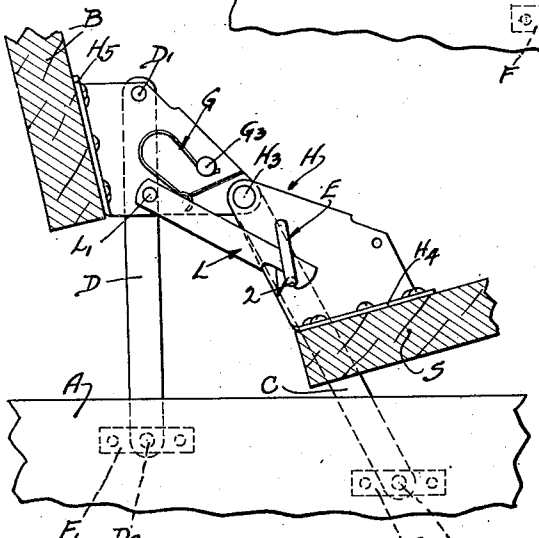


Fig. 3

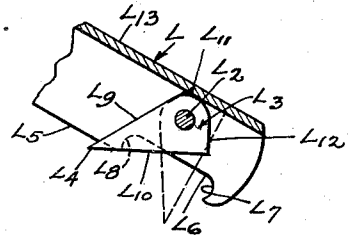


Fig. 5

Inventor:
MAXIMILIAN REU BOIU
By
Attorney.

Patented Aug. 24, 1948

2,447,683

UNITED STATES PATENT OFFICE

2,447,683

SOFA BED HINGE

Maximilian Reu Boiu, Pasadena, Calif., assignor, by mesne assignments, to The Signal Manufacturing Company, Los Angeles, Calif., a corporation of California

Application December 11, 1944, Serial No. 567,554

3 Claims. (Cl. 5—47)

1

This invention relates to and for an object the provision of a hinge structure for use on sofas which are arranged so as to be adjusted for changing the sofa into a bed, or vice versa, and comprehends the provision of certain improvements of simple and economical form and arrangement which contribute to easy and quick adjustment of the sofa for a desired purpose.

It is well known that sofas which are transformable into beds have two main sections—one constituting normally a seat, and the other a back for the seat. When desired, however, both the seat and the back section are commonly adjustable on hinges at their opposite ends whereby both sections may be moved into a common horizontal plane with adjacent edges abutting so as to provide a bed having the width equal to the combined width of said sections. The seat and back sections are supported on a suitable base which may or may not, but usually does, have upstanding ends forming area rests for a seat and head and foot pieces for a bed.

It is an object of this invention to provide an improved type of hinge—one of which is used at each end of the sofa and each of which is identical with the other except for necessary right and left hand characteristics, and includes a pair of plates hinged together and attached, respectively, to the seat and back sections, rockable supports pivotally and slidably connecting said plates and their attached sections to a suitable base, and a latch carried by one of the hinge plates and adapted at its free end to lockingly engage a portion on the other hinge plate, for selectively supporting the two sofa sections in substantially right angular planes as when used to form a seat or in a common horizontal plane when adjusted to form a bed.

Another object is to provide a sturdy, simple, inexpensive and dependable hinge structure which is easily operated. Other objects may appear as the description progresses.

I have shown a preferred form of sofa hinge embodying my improvements in the accompanying drawing subject to modification, within the scope of the appended claims, without departing from the spirit of the invention. In said drawing:

Fig. 1 is a fragmentary sectional elevation of a sofa adjacent an end thereof showing my hinge connected to the seat and back sections and frame of a conventional type of sofa and adjusted to form a seat;

Fig. 2 is a sectional elevation in a plane at right angles to Fig. 1;

2

Fig. 3 is a view in the plane of Fig. 1 showing the seat section slightly elevated as when it is desired to unlock the hinge and adjust the seat and back sections to form a bed;

Fig. 4 is a view of the structure of Figs. 1 and 3 after having been adjusted to form a bed; and

Fig. 5 is an enlarged fragmentary view of the latch structure.

Briefly described a typical sofa to which my hinge structure is applicable includes a seat section S, a back section B, a suitable stationary base A, and a hinge unit H, one of which hinge units is employed at each end of the sofa for operatively connecting the seat and back sections and the supporting base.

Each hinge unit includes a pair of plates H_1 and H_2 which as viewed in Figs. 1, 2, 3 and 4 are substantially of trapezoidal form, though not necessarily so, and are hinged together on a pintle H_3. Said plates have inwardly turned flanges H_4 and H_5 which are secured as shown, or otherwise, to seat S and back B. Pintle H_3 is located at a point remote from both flanges H_4 and H_5.

The hinge plates H_1 and H_2 and, of course, the seat S and back B, are supported on base A so that the back B may be swung downwardly into the horizontal plane of seat S, and seat S, of course, moves forwardly relative to the base A so as to accommodate the base to back B.

To such end, a supporting bar C is pivotally held at its upper end on pintle H_3 and at its lower end on a fixture F at a point C_1 affixed to base A; also a second supporting bar D is pivotally connected at a point D_1 at its upper end to plate H_2 and at its lower end at a point D_2 to a fixture F_1 affixed to base A. As shown in Figs. 1, 3 and 4, the bar D is slightly longer than bar C and is hinged to plate H_2 at a point substantially above pintle H_3 to which bar C is pivoted. Bar D is also attached to base A above the horizontal plane of the pivot C_1 of bar C. Thus, as shown in Figs. 3 and 4, when it is desired to form a bed of sections S and B, the hinge plate H_2 will swing in a clockwise direction (Fig. 1) on the axis D_2 and both plates H_1 and H_2 will swing in a corresponding direction on axis C_1 until, as shown in Fig. 4, both seat S and back B rest upon the upper surface of base A.

A latch L is pivotally held at L_1 on plate H_2 on a line substantially cutting the axis D_1 and D_2 at times when sections S and B are positioned for forming a seat (Fig. 1), and its free

end extends over plate H, and between the spaced legs 1 and 2 of a staple E which serves as a guide for the latch as well as a stop for limiting the swing of said latch.

I preferably form latch L of a strip of metal bent into a slender but deep U cross section, so as to prevent an accumulation of lint, dirt, etc., which would tend to impair the operation of the latch. At a point L_2 near the free end of latch L I provide a trigger L_3 (Fig. 5) which is of generally triangular form with the point L_4 therefrom extending slightly below the margin L_5 and movably disposed within predetermined limits relative to marginal recesses L_6 formed on the latch and terminating in spaced shoulders L_7 and L_8 adapted at times to engage leg 2 of the staple E. Trigger L_3 is formed with edges L_9 and L_{10} and also relatively angular edges L_{11} and L_{12}. Edges L_9 and L_{10} engage leg 2 of staple E and portions L_{11} and L_{12} engage the web L_{13} of latch L in order to regulate the operation of the latch and to limit the swing of the trigger.

As shown in Figs. 1, 3 and 4 the latch L is constantly urged into locking engagement with the leg 2 of staple E by means of a spring G which has a central loop or bend G_1, and extremity G_2 held by a pin or screw G_3 and an opposite extremity G_4 extending through a perforation in the web of latch L. Thus spring G being anchored at G_3 bears against latch L and tends to apply pressure to and for holding the latch in locking engagement with staple E.

Now, referring to Fig. 1, it will be noted that when the sections S and B are disposed to form a seat, pressure or weight applied to either of said sections will tend to lock the hinges against the possibility of folding or adjustment because of the engagement of leg 2 of staple E with shoulder L_8 of the latch, and, under such conditions, leg 2 will be to the left of trigger L_3 and either in engagement with or close to the edge L_9 of the trigger. Also the trigger is prevented from moving to the right (Fig. 1) until there can be a relative movement of the sections B and S, because the edge L_{12} of the trigger will engage the web L_{13} and prevent movement of the trigger in a clockwise direction.

When it is desired to arrange the structure as a bed it is necessary to first unlock the latch, it being remembered that as shown in Fig. 1 the leg 2 of staple E is confined in its position between shoulder L_8 of the latch and edge L_9 of the trigger L_3. So, by slightly raising seat S and swinging the seat on its hinge H_3 in a counter-clockwise direction the leg 2 of the staple moves away from shoulder L_8 and slides over the edge L_9 of the trigger as well as over the point L_4 of the trigger while the trigger is held with its edge L_{12} against web L_{13} of the latch, thereby unlatching and rendering members B and S free to move forwardly together on their hinges C_1 and D_2 until they finally assume coplanar positions as shown in Fig. 4. During such movement the trigger is free to retract in a clockwise direction as shown in Fig. 5 and latch L will move forwardly in staple E to its ultimate position shown in Fig. 4, the leg 2 of the staple sliding over the edge L_{10} of the trigger and thence rearwardly over edge L_5 of the latch. Spring G at all times holds the latch frictionally engaged with leg 2 of the latch. Thus, it is observed that the trigger can not be swung in a counter-clockwise direction on the latch beyond the position established therefor by the engagement of edge L_{12} with web L_{13} and serves to lock members B and S in seat position until a movement of seat S disengages the latch from the trigger. Said trigger, therefore serves as a cam over which leg 2 slides when converting the structure from a bed to a seat and vice versa.

When the structure is changed from bed to seat forming positon member B may be raised simultaneously with the rearward sliding of member S, during which movement latch L is moved in staple E from the position shown in Fig. 4 to that shown in Fig. 1 and when leg 2 engages portion L_4 of the trigger the trigger is forced into the position shown in dotted lines in Fig. 5 and leg 2 drops into position between shoulder L_8 and edge L_9 of the trigger, thereby again locking the members B and S in seat position.

An important feature of my hinge consists in the initial forming of the hinge plates H_1 and H_2 by means of a single stamping die, so that separate dies for the right and left hand ends of a sofa are not required. However, in order that the plates H_1 and H_2 may be disposed in a common plane one of the plates, as at H_2, may be slightly offset in the vicinity of the pintle H_3, as shown in Fig. 1, and the perforations in the plates for hinges D_1, L_1, G_3 and the legs 1 and 2 of the staple E may be formed in both of said plates at corresponding positions so that said plates may be engageably connected with the bars C and D, latch L, staple E and spring G.

It is apparent that when the structure is latched in seat forming positions the latch L is locked as shown in Fig. 1 with the leg 2 of the staple or keeper E confined between shoulder L_8 and edge L_9 of the trigger. Hence pressure on the seat or on the back can not disengage or release the latch. But, if seat S is slightly raised, the latch will be caused to move relative to the keeper to an extent which will cause leg 2 of the keeper to slide over edge L_9 and fall to a position between edge L_{10} and shoulder L_7, thereby preventing further movement of members B and S in the direction of each other. Latch L is limited in its upward thrust by leg 1 of the keeper so that its lower edge will always slide on leg 2 of the keeper. The latch is not necessary to hold the back and seat in their common horizontal plane when arranged for use as a bed but when the structure is converted from a bed to a seat the seat is grasped on its free edge and raised to a point at which the latch will have moved into the latching position of Fig. 1, after which the seat is depressed into horizontal position against the frame A and simultaneously therewith the back is moved into seat position by swinging the structure bodily on pintles C_1 and D_2 of bars C and D, respectively.

I claim:

1. In a sofa hinge the combination of: pivotally connected seat and back plates, said plates being arranged for connection to seat and back structures respectively to releasably hold the back structure in an erect position above the seat structure; the seat plate having a guide provided with a locking arm; a latch bar of U-shaped cross section pivotally connected at one end to the back plate and extending through the guide of the seat plate; means urging the open edge of the U-shaped latch bar into engagement with the locking arm; a notch forming a pair of spaced shoulders in the open edge of the latch bar; a substantially triangular trigger mechanism on the latch bar adapted to latch and unlatch the

bar relative to the arm comprising a trigger pivotally positioned within the U-shaped bar, said trigger being pivoted at its base portion with conjoining cam surfaces depending between the shoulders of the latch bar, said base portion having plural stops cooperating with the web of the latch bar to limit the pivotal movement of the trigger; the first of said stops limiting the rearward of the trigger to a position covering the first shoulder of the latch bar and the second stop confining the forward movement of the trigger to a position substantially intermediate the shoulders of the latch bar, the innermost cam surface cooperating with the first shoulder to place said shoulder into engagement with the locking arm, when the plates are moved in one direction relative to each other, and when said second stop portion engages said latch web, said cam surface contacting the locking arm to guide said first shoulder away from the locking arm when the plates are pivoted relative to each other in the same direction; whereby said locking arm takes a position between said second cam surface and said second shoulder, said last-named cam surface of the trigger, upon pivotal movement of the plates in a reverse direction and engagement of said first stop portion of the trigger with the latch bar, forming a guide for the locking arm away from the second shoulder and over the first shoulder to allow the back structure to assume a coplanar relation with the seat structure.

2. In a sofa hinge as defined in claim 1 wherein the means urging the open edge of the U-shaped latch bar into engagement with the locking arm is in the form of a spring.

3. In a sofa hinge the combination of: pivotally connected seat and back plates, said plates being arranged for connection to seat and back structures respectively to releasably hold the back structure in an erect position above the seat structure; the seat plate having a guide provided with a locking arm; a latch bar pivotally connected at one end to the back plate and extending through the guide of the seat plate; means urging one edge of the latch bar into engagement with the locking arm; a notch forming a pair of spaced shoulders in one edge of the latch bar; a

substantially triangular trigger mechanism on the latch bar adapted to latch and unlatch the bar relative to the arm comprising a trigger pivotally positioned on the bar, said trigger being pivoted at its base portion with conjoining cam surfaces depending between the shoulders of the latch bar, said base portion having plural stops cooperating with a web on the latch bar to limit the pivotal movement of the trigger; the first of said stops limiting the rearward movement of the trigger to a position covering the first shoulder of the latch bar and the second stop confining the forward movement of the trigger to a position substantially intermediate the shoulders of the latch bar, the innermost cam surface cooperating with the first shoulder to place said shoulder into engagement with the locking arm, when the plates are moved in one direction relative to each other, and when said second stop portion engages said latch web, said cam surface contacting the locking arm to guide said first shoulder away from the locking arm when the plates are pivoted relative to each other in the same direction; whereby said locking arm takes a position between said second cam surface and said second shoulder, said last-named cam surface of the trigger, upon pivotal movement of the plates in a reverse direction and engagement of said first stop portion of the trigger with the latch bar, forming a guide for the locking arm away from the second shoulder and over the first shoulder to allow the back structure to assume a coplanar relation with the seat structure.

MAXIMILIAN REU BOIU.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
833,903	Wagner	Oct. 23, 1906
1,140,852	Roeder	May 25, 1915
2,224,825	Krakauer et al.	Dec. 10, 1940
2,317,105	Neunherz	Apr. 20, 1943
2,334,493	Johnson	Nov. 16, 1943
2,343,642	Burton	Mar. 7, 1944