May 10, 1949. J. FURLIN 2,469,720

COMBINATION CHAIR AND LADDER

Filed Dec. 6, 1947

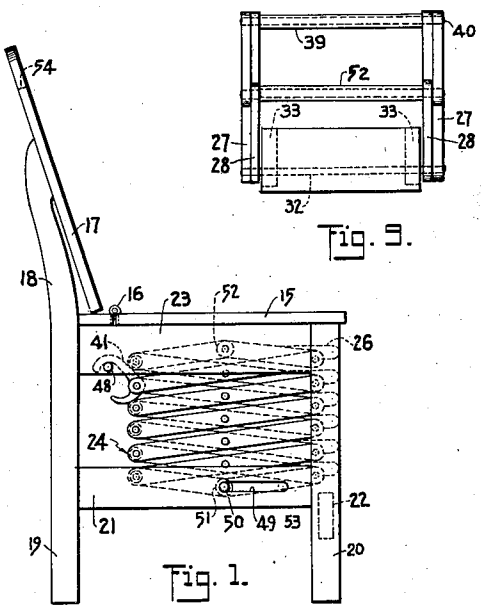


Fig. 1.

Fig. 9.

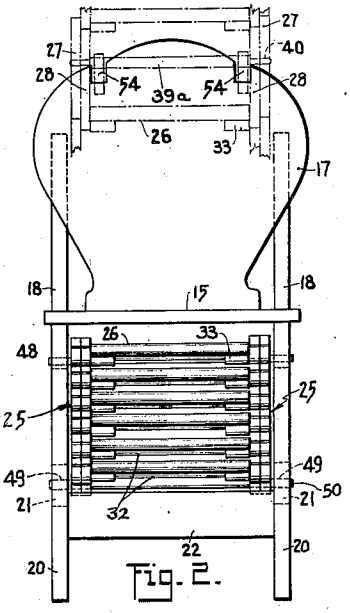


Fig. 2.

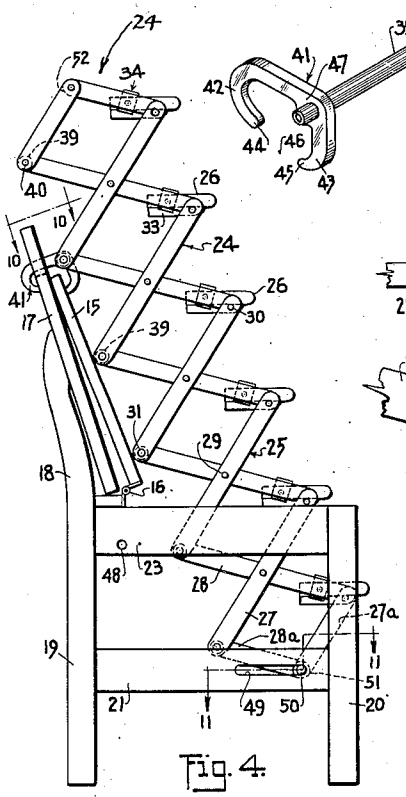


Fig. 4.

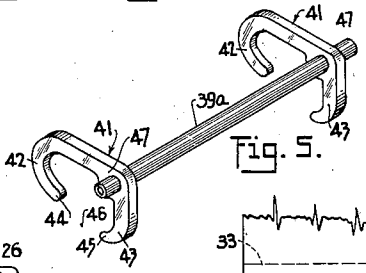


Fig. 5.

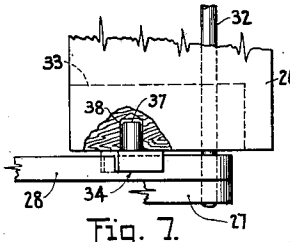


Fig. 7.

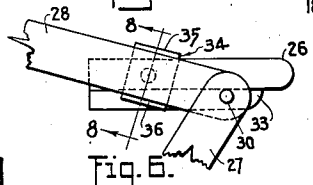


Fig. 6.

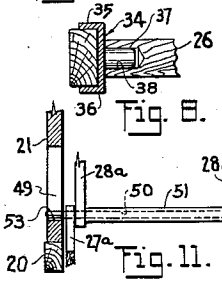


Fig. 8.

Fig. 11.

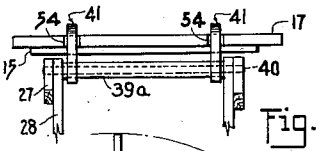


Fig. 10.

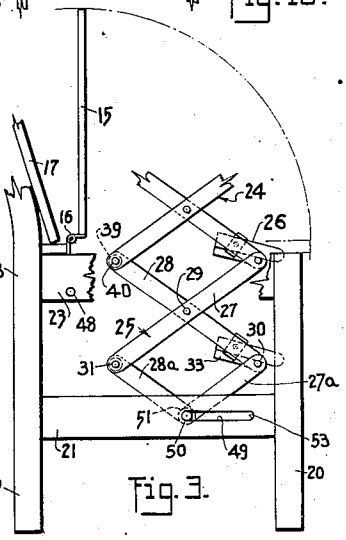


Fig. 3.

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COMBINATION CHAIR AND LADDER

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5 Claims. (Cl. 155—42)

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This invention relates to combination chair and ladder structures, and more particularly to chairs that are convertible into ladders by manual manipulation.

Most devices of this class are limited in respect to the height of the ladder—those structures offering more than average ladder heights being generally cumbersome, costly, unstable and difficult to manipulate. It is primarily within the contemplation of my invention to present a combination chair and ladder structure having none of the aforesaid shortcomings, which is capable of use as a conventional chair, and which can readily be transformed into a ladder of considerably more than the average ladder heights found in most devices in the said category.

More specifically, it is an object of my invention to provide a chair having a ladder portion normally collapsible to an unobstructive position when not in use, and being extensible to a height above the top of the back rest of the chair.

It is a further object of this invention to maintain the ladder portion firmly and immovably in both its inoperative and operative positions, and particularly to hold the ladder against forward and backward displacement and against lateral shifting, when in its extended condition.

Still another object is to enable the ladder to be maintained in its said extended condition by using structural elements which are normally component parts of the chair.

It is also an object of my invention to enable the ladder portion to be brought to its extended operative condition and returned to its inoperative retracted or collapsed condition with a minimum of manipulative effort.

Other objects, features and advantages will appear from the drawings and the descriptions hereinafter given.

Referring to the drawings,

Figure 1 is a side view of a preferred form of the combination chair and ladder of my invention shown with the ladder portion in its inoperative collapsed condition.

Figure 2 is a front view of the device of Fig. 1, the dot-dash lines showing the ladder in its extended operative condition.

Figure 3 is a fragmentary side view of the device showing the position of the parts during the operation of converting the chair to a ladder.

Figure 4 is a side view of the device shown with the ladder in its fully extended position.

Figure 5 is a perspective view of the pivotally mounted ladder anchor.

Figure 6 is an enlarged fragmentary side view

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of the side extension members and a ladder step operatively supported thereby.

Figure 7 is a fragmentary top view of Fig. 6, a part being broken away for clarity.

Figure 8 is a section of Fig. 7 taken substantially along line 8—8.

Figure 9 is a top view of the ladder portion in its extended condition.

Figure 10 is a section of Fig. 4 taken along line 10—10, and

Figure 11 is a section of Fig. 4 taken along line 11—11.

In the preferred form of my invention illustrated, the device comprises a seat 15 pivotally secured in place at the hinges 16, a back rest 17 supported by the rear uprights 18 extending upwardly from the rear legs 19, front legs 20, side leg braces 21, front leg brace 22, side seat supports 23, and the ladder portion 24 to be hereinafter described. The said seat 15 is pivotally movable from its operative horizontal position shown in Fig. 1 to its raised operative position against the back rest 17, as shown in Fig. 4. The ladder portion 24 is supported in its inoperative collapsed condition underneath the seat 15 primarily by the side leg braces 21, as well as by the side seat supports 23 in the preferred construction; and in its extended position the ladder is supported by said leg braces 21 and by the back rest 17, all as will more clearly hereinafter appear.

The ladder portion 24 consists, in the preferred embodiment shown, of two lateral extensible members 25 pivotally supporting therebetween the steps 26. The extensible members each contains a lattice-work arrangement of outer and inner bars 27 and 28, respectively, adjacent outer and inner bars being in crossing relation and pivotally connected at their centers 29, and at the front and rear axes 30 and 31, respectively, on the terminals of the adjacent bars flanking their said centers. The lattice-work construction above described is not herein claimed as the invention per se, since it is a well-known extensible device, the invention herein, in one aspect thereof, consisting of its use in the manner and in the combination herein described. Accordingly, for the purposes of this specification, the said lattice-work construction will at times be herein referred to as "extensible lateral supports."

Pivotally connecting, at axes 30, the front terminals of the laterally opposed sets of coacting outer and inner bars 27 and 28, are the cross rods 32 in underlying engagement with the steps 26. In the embodiment illustrated, each step is provided with two side strips 33 attached to the

underside thereof, the corresponding cross rod **32** rotatably extending therethrough, whereby the said rods **32** are maintained in engagement with the underside of their respective steps. Each step is further provided, on each side thereof and rearwardly of axis **30**, with a channel member **34** containing upper and lower parallel walls **35** and **36**, respectively, and an inwardly extending shaft **37** rotatably mounted within transversely extending apertured portion **38** of the step—the said walls **35** and **36** being in embracing engagement with the upper and lower edges of the adjacent bars **28** of the adjacent extensible support **25**. The arrangement is such that in the various relative angular positions of the steps and the bars of the said extensible supports, the said walls **35** and **36** of the channel members will always be engageable with the said bars, because of the pivotal connection of the channel members to the steps, and will accordingly serve to hold the steps against rotation. More specifically, since the steps are each and at all times supported by a cross rod **32** and a rearwardly disposed pair of channel members **34** embracing bars **28**, the upper wall **35** of each channel will prevent a counterclockwise rotation of step about rod **32**, whereas the lower wall **36** will prevent a clockwise rotation thereabout.

At the rear of the ladder portion, the opposite extensible lateral supports **25** are separated by spacer bars **39**, these being preferably rotatably mounted on the rods **40** pivotally connecting the rear ends of the lattice-work bars **27** and **28**. One of the spacer bars **39***a*, preferably one near the top and of hollow metallic tubular construction, has fixedly mounted thereupon the two spaced substantially C-shaped anchor hooks **41** each having two curved fingers **42** and **43** the inner terminals **44** and **45** of which are separated by a downwardly disposed apertured portion **46** and an upper connecting portion **47**. These anchor hooks serve to hold the ladder **24** in both its upper extended and lower contracted condition, as will hereinafter appear.

The side seat supports **23** have secured thereto near the rear of the device the anchor rest bar **48**; and the side leg braces **21** contain, at the forward part thereof, the horizontal slots **49**. The bottom of the ladder, preferably at the lowermost pivotal connection of the bottom bars **27***a* and **28***a*, contains a base cross bar **50** extending through a spacer tube **51** between the laterally opposite pairs of bars **27***a* and **28***a*, the base bar **50** extending into said slots and being slidably movable therealong.

When the device is used as a chair with the seat **15** down, the lateral extensible supports **25** are in their maximum contracted condition, as shown in Fig. 1, the entire ladder portion being below the seat, the anchor hooks **41** anchored upon the bar **48**, and the base bar **50** disposed at the rear of the slots **49**. In this position the ladder is held against displacement, and is sufficiently rearwardly disposed as to be substantially entirely contained within the boundaries defined by the legs and seat, thereby being in an entirely unobstructing condition.

To convert the chair into a ladder, the seat **15** is raised, as suggested in Fig. 3, bringing it against the back rest as shown in Fig. 4; and then the uppermost cross bar or spacer **52** is grasped and an upward pull applied, to operatively extend the ladder to its maximum height. Then the fully extended ladder is tilted rearwardly; forcing the base bar **50** to slidably move to the front of

the slot **49** and into abutment with the front wall **53** thereof. The anchor hooks **41** are placed over the top of the back rest **17** and supported thereupon. In the preferred embodiment illustrated, the upper edge of the back rest is provided with two recessed or slotted portions **54**, arranged and proportioned to receive the upper connecting portions **47** of the hooks, the space **46** at the bottom of the hook being proportioned to accommodate therein the combined thickness of the back rest **17** and seat **15**, as indicated in Fig. 4, whereby the fingers **44** and **45** are in engagement with the opposite surfaces of the seat and back rest.

The arrangement is hence such that the ladder is firmly held in its fully extended condition to a height above the top of the back rest, and is maintained in this position against lateral shifting by the side walls of the slots **54** which engage the hooks **41** as well as by the pairs of side bars **21** and **23** flanking the ladder at the lower portion thereof; and it is held against forward and backward displacement by the coactive action of the anchor hooks **41** and the base bar **50** in engagement with the hook rest and raised seat and the front wall **53** of slot **49**, respectively. Furthermore, when the ladder is raised, the rear portions thereof in front of the raised seat are in abutment therewith, thereby providing a further support for the raised ladder.

It will be noted that there is no cross member underlying the front of the seat, thereby presenting no obstruction to the upward and forward movement of the ladder to its fully extended position.

In the accompanying drawings, the invention has been shown merely by way of example and in preferred form; but obviously many variations and modifications may be made therein which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or embodiment, except insofar as such limitations are specified in the appended claims.

I claim:

1. A combination chair and ladder comprising a back rest, a pair of front legs, a pair of rear legs, two side seat supports, a seat pivoted thereon movable between a horizontal position upon said supports and a raised position against said back rest, two braces each connecting a front and corresponding rear leg and disposed a predetermined distance below said seat supports, an extensible ladder supported by said braces, said ladder containing two extensible lateral supports and a plurality of steps operatively supported therebetween, said ladder being extensible from a collapsed condition below the said horizontal position of the seat to a predetermined raised position thereabove, and anchor means attached to the ladder and engageable with the chair for holding the ladder in said raised position, said braces containing substantially horizontally disposed slotted portions, said ladder containing at the bottom thereof a base cross bar the lateral terminal portions of which extend into and are slidably engageable with said slotted portions, whereby the ladder is slidably supported by said slotted portions.

2. A combination chair and ladder according to claim 1, said slotted portions being disposed at the forward portion of said braces, said cross bar being engageable with the front walls of said slotted portions, whereby the ladder when in its raised condition is held against forward and

rearward displacement by said front walls and said back rest.

3. A combination chair and ladder comprising a back rest, a pair of front legs, a pair of rear legs, two side seat supports, a seat pivoted thereon movable between a horizontal position upon said supports and a raised position against said back rest, two braces each connecting a front and corresponding rear leg and disposed a predetermined distance below said seat supports, an extensible ladder containing at the bottom thereof a base cross bar supported between said braces, two extensible lateral supports, a plurality of steps between said extensible supports and supported thereon and a plurality of cross rods supported by said extensible supports and in underlying engagement with said steps, said ladder being extensible from a collapsed condition below the said horizontal position of the seat to a predetermined raised position thereabove, and a plurality of anchor hooks attached to a predetermined upper portion of the ladder and engageable with the upper edge of the back rest for holding the ladder in said raised condition, said extensible lateral supports each comprising a lattice-work arrangement of outer and inner bars in crossing relation and pivotally mounted at their centers and at front and rear terminals of the adjacent bars flanking their said centers, the said cross rods pivotly connecting the forward terminals of the laterally opposed sets of coacting inner and outer bars.

4. A combination chair and ladder comprising a back rest, a pair of front legs, a pair of rear legs, two side seat supports, a seat pivoted thereon movable between a horizontal position upon said supports and a raised position against said back rest, two braces each connecting a front and corresponding rear leg and disposed a predetermined distance below said seat supports, an extensible ladder containing at the bottom thereof a base cross bar supported between said braces, two extensible lateral supports, a plurality of steps between said extensible supports and a plurality of cross rods supported by said extensible supports and in underlying engagement with said steps, said ladder being extensible from a collapsed condition below the said horizontal position of the seat to a predetermined raised position thereabove, and a plurality of anchor hooks attached to a predetermined upper portion of the ladder and engageable with the upper edge of the back rest for holding the ladder in said raised condition, said extensible lateral supports each comprising a lattice-work arrangement of outer and inner bars in crossing relation and pivotally mounted at

their centers and at front and rear terminals of the adjacent bars flanking their said centers, the said cross rods pivotally connecting the forward terminals of the laterally opposed sets of coacting inner and outer bars, each of said steps being provided at opposite lateral ends thereof with rotatably mounted channel members having upper and lower walls in embracing engagement with the upper and lower edges of the adjacent bars of the adjacent extensible support.

5. A combination chair and ladder comprising a back rest, a pair of front legs, a pair of rear legs, two side seat supports, a seat pivoted thereon movable between a horizontal position upon said supports and a raised position against said back rest, two braces each connecting a front and corresponding rear leg and disposed a predetermined distance below said seat supports, an extensible ladder containing at the bottom thereof a base cross bar supported between said braces, two extensible lateral supports, a plurality of steps between said extensible supports and a plurality of cross rods supported by said extensible supports and in underlying engagement with said steps, said ladder being extensible from a collapsed condition below the said horizontal position of the seat to a predetermined raised position thereabove, and a plurality of anchor hooks attached to a predetermined upper portion of the ladder and engageable with the upper edge of the back rest for holding the ladder in said raised condition, each of said steps being provided at opposite lateral ends thereof with rotatably mounted channel members in embracing engagement with adjacent portions of said extensible lateral supports.

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