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C. E. KENNETT

CONVERTIBLE LADDER

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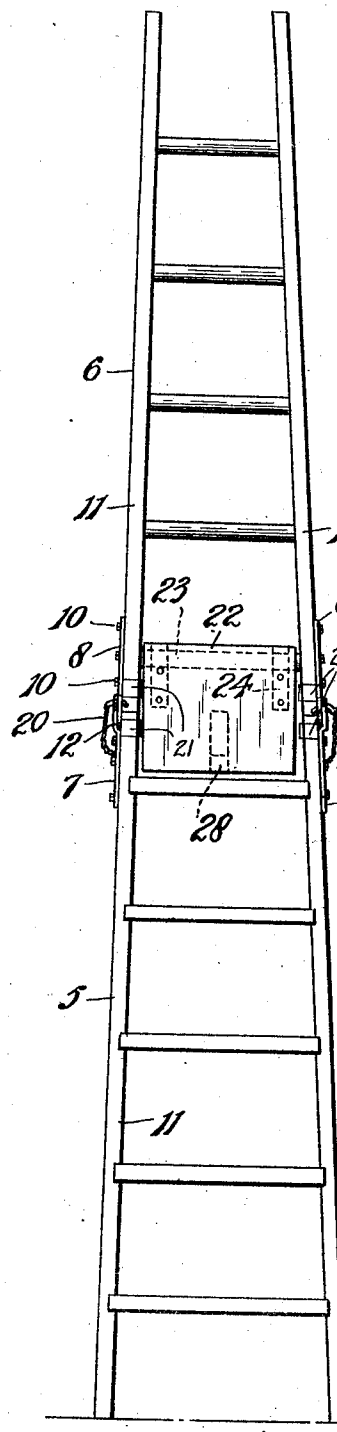


Fig. 1.

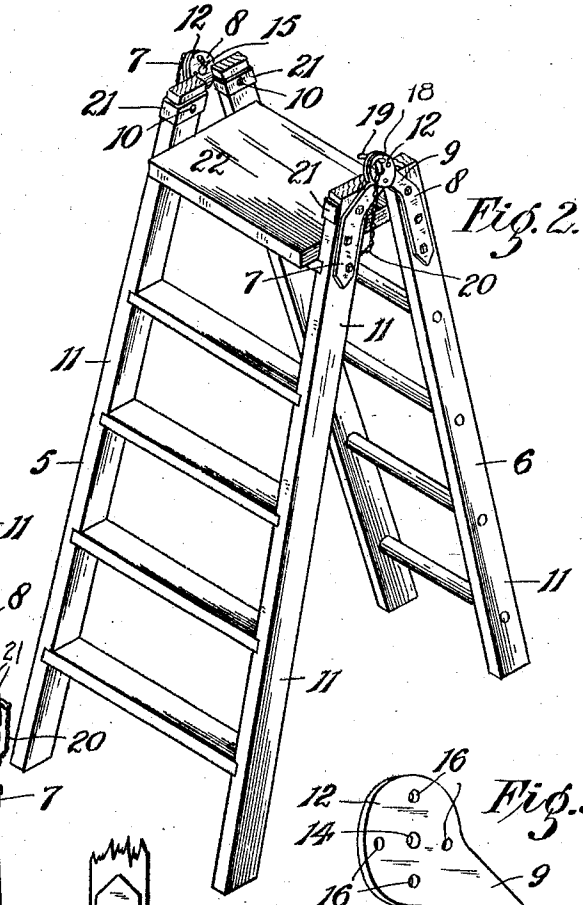


Fig. 2.

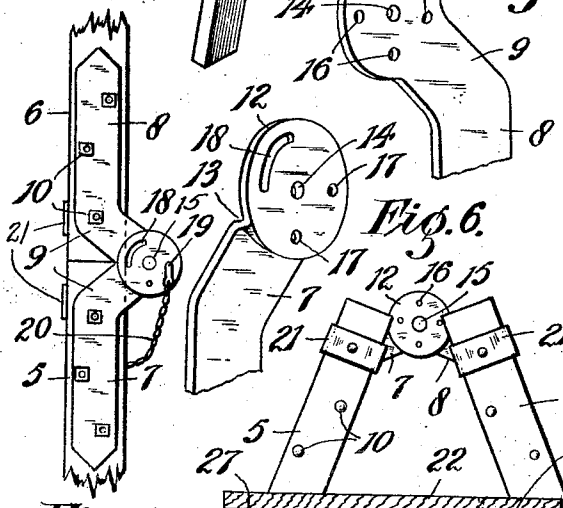


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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CONVERTIBLE LADDER.

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This invention relates to improvements in convertible ladders having two hingedly connected sections so arranged that the same can be brought into alignment in prolongation of the main ladder section to provide a wall ladder, and when a step-ladder is required the upper hinged section is downwardly folded to function as a strut, provision being made to securely lock the said ladder sections in either required position.

The present invention has been devised to provide a convertible ladder of simple, specially durable and economical construction, and included amongst its objects are the provision of improved means for locking the ladder sections in selected relative positions, reinforcing means to obviate splitting of the side bars of said ladder sections, and improved means for preventing accidental spread of said sections when the ladder is converted for use as a step-ladder.

According to the invention, I provide a convertible ladder formed of two sections—one having steps and the other furnished with rungs. Fitted to each of said sections are hinge pieces pivotally secured together. One of the hinge pieces is formed with holes and an arcuate slot to register with a series of adjustment holes in the opposed hinge piece, and locking members passed through said holes or the arcuate slot in one hinge piece and through one of the adjustment holes in the other hinge piece rigidly lock the ladder sections in selected relative positions. Reinforcing metal clips are fitted to the ends of the side bars of the ladder sections to obviate splitting around the hinge pieces when the ladder is subjected to heavy strains. Pivotally connected to one of the rungs of the upper ladder section is a locking platform member having a hook adapted to fit around and grip one of the steps of the lower ladder section to prevent accidental spread of the hinged sections when converted to a step-ladder.

Reference is made to the accompanying drawings, wherein:—

Figure 1 is a view in front elevation of a convertible ladder according to the invention, showing the two hingedly connected sections locked in alignment to provide a wall ladder.

Figure 2 is a perspective view illustrating the ladder seen in Figure 1 converted for use as a step-ladder.

Figure 3 is a sectional view illustrating the locking platform member for preventing spread of the ladder sections when converted to a step-ladder.

Figure 4 is a detail view in side elevation showing the hinge connection between the ladder sections when placed in alignment as shown in Figure 1.

Figures 5 and 6 are perspective views of the hinge pieces connecting the ladder sections.

The improved convertible ladder comprises a lower main section 5 provided with a series of steps, and an upper movable section 6 ordinarily having rungs such as are used in wall-ladders. The two ladder sections are hingedly connected together at opposite sides by hinge devices, each of which comprises two hinge pieces 7 and 8 having angular extensions 9. Said hinge pieces 7 and 8 are apertured to receive bolts 10, by which they are affixed to the outer surfaces and adjacent to the ends of the side bars 11 of the ladder sections.

At the extremities of the angular extensions 9 of the hinge pieces there are provided flat bearing portions 12 of approximately circular configuration. The flat portions 12 of the hinge pieces 8 that are secured to the upper ladder section 6 are in alignment with the angular extensions 9 of said hinge pieces, but the flat portions 12 of the hinge pieces 7 secured to the lower ladder section 5 are offset or stepped as at 13 from the angular extensions 9 to provide snug seatings to accommodate the flat portions of the hinge pieces 8.

Formed centrally in the flat bearing portions 12 of each of the hinge pieces 7 and 8 is a hole 14, through which is passed a rivet 15 to pivotally connect the hinge pieces together. Formed in the flat portions 12 of the hinge pieces 8 fitted to the upper ladder section 6 are four spaced holes 16 while on the flat portions 12 of the offset hinge pieces 7 secured to the lower ladder section 5 there are formed two holes 17 and an arcuate slot 18.

When the ladder sections 5 and 6 are placed in alignment to provide a wall ladder, the ends of the side bars 11 are in abutment, and a hole 17 of each of the offset hinge pieces 7 registers with a hole 16 of the opposed hinge pieces 8. Pins 19 are then inserted through said registering holes to

rigidly lock the two ladder sections together. These pins are of curved shape and they are attached to chains 20 which are fastened to the lower ladder section 5.

The holes 16 in the hinge pieces 8 and the holes 17 and the arcuate slots 18 formed in the hinge pieces 7 are so spaced that when the upper ladder section 6 is folded downwardly as is shown in Figure 2 to provide a step-ladder, said arcuate slots 18 register with the holes 16 and permit the insertion of the pins 19 to prevent spreading of the ladder sections.

When the ladder is converted to a step-ladder, the arcuate slots 18 in the hinge pieces 7 enable a wide range of angular adjustments of the ladder sections to be obtained, without removing the pins 19. Thus the sections can be tightly folded together to assist in the portability of the ladder. The provision of a number of holes 16 and 17 in the hinge pieces enables the ladder sections to be locked at a position other than shown in Figures 1 and 2, as for example at a midway position, so that when required the ladder can be used in forming a scaffold for operatives.

Metal reinforcing clips 21 of U-shape are fitted around the ends of the side bars 11 of the ladder sections and prevent them from splitting around the hinge-pieces 7 and 8, when the ladder is bearing a heavy load. These clips are affixed by the bolts 10, which secure the hinge-pieces to the said side members.

A flat locking member 22, formed preferably of wood, is pivotally mounted upon the lowermost rung 23 of the upper ladder section 6 by means of metal hinge straps 24. These hinge straps have circular shaped ends 25 to fit loosely around the ladder rung 23, and they are secured in shallow grooves 26 formed on the underneath surface of the locking member 22, and lie flush therewith.

Secured to said locking member 22 is a metal bar 27 having a hooked end 28 designed to fit around the uppermost step 29 of the main ladder section 5.

When the ladder has been converted for use as a step-ladder, the flat locking member 22 is first swung around upon the rung 23 so that it rests upon the uppermost step 29 of the ladder section 5. The ladder sections are then moved inwardly toward each other to cause the hooked end 28 of the metal bar 27 on said locking member to fit beneath the step 29 and thus lock together the ladder sections and restraining them from spreading.

The pivoted flat member 22, while providing additional locking means for the ladder sections, also serves as a platform for supporting tools, receptacles and utensils required by workmen, when using the ladder as a step-ladder.

When the ladder is being converted to a wall ladder, the hooked end 28 of the metal bar 27 is first disengaged from the ladder step 29 and the pivoted locking member 22 is then swung around so that it depends from the lowermost rung 23 of the upper ladder section 6 and fits between said rung and the uppermost step 29 of the lower section 5, without presenting any obstruction a person ascending or descending the wall ladder.

What I do claim is:

An improved convertible ladder, comprising independent ladder sections, hinged members carried by the sections and operative to permit the sections to be arranged in line to form an upright ladder or in angular relation to form a step ladder, said hinged members including a disc connected to each ladder section, with said discs arranged in contact and mounted for independent rotation, each of the discs being formed with openings adapted to register when the ladder sections are in position to form a long ladder, one of the discs being formed with an arcuate slot adapted to register with one of the openings in the other disc when the sections are in position to form a step ladder, and a pin engaging the cooperating openings in the discs to limit the relative movement of the discs, the cooperation of the pin with the opening in one disc and the slot in the other permitting a limited relative movement of the ladder sections when in step ladder relation to provide a range of angular adjustments of the ladder sections.

In testimony whereof I affix my signature.

CHARLES E. KENNETT.